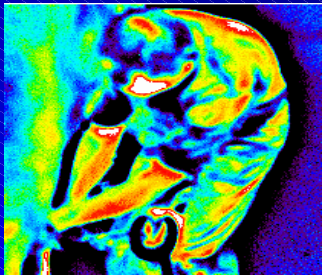


VISIT...

LANZAROTE
Caliente.COM

DIAGNOSIS and TREATMENT of FOOT LAMENESS



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Dipl.ACVS

University of Minnesota



PALMAR DIGITAL NERVE BLOCK

**ONE-THIRD OF ALL
CHRONIC
FORELIMB
LAMENESS ARE
IMPROVED BY
PALMAR DIGITAL
ANALGESIC
INJECTION**



HOOF PROBLEMS

HOOF WALL
DEFECTS SUCH
AS CRACKS or
CLEFTS THAT
INVOLVE THE
SENSITIVE
TISSUES



HOOF PROBLEMS

- ANY LAMINAR
TEARING,
SEPARATION or
INFLAMMATION



HOOF PROBLEMS

- CONTUSIONS OF THE HOOF CAUSING BRUISING OR CORN FORMATION



HOOF PROBLEMS

- ABSCESS
FORMATION



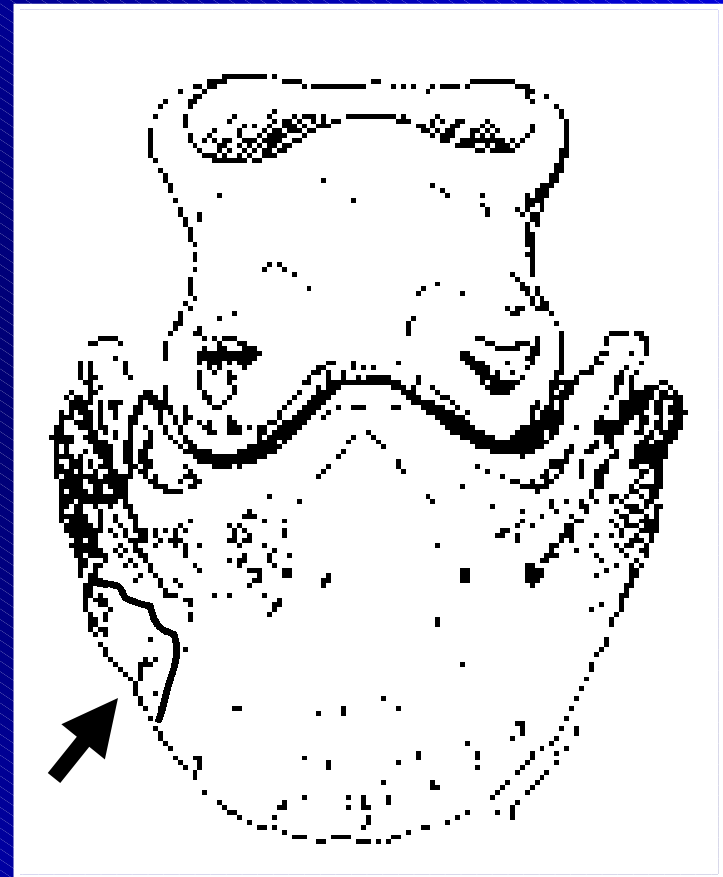
HOOF PROBLEMS

- **PODODERMATITIS**
(thrush or canker)



THIRD PHALANX LAMENESS

- FRACTURES
- Marginal fractures
- Solar fractures



THIRD PHALANX LAMENESS

- DEEP DIGITAL
INSERTIONAL
TENOPATHY



CONDITIONS of the PODOTROCHLEA

- DISTAL INTERPHALANGEAL SYNOVITIS
- DEEP DIGITAL FLEXOR TENDINITIS
- DESMITIS, COLLATERAL SESAMOIDEAN or IMPAR
- NAVICULAR OSTEITIS/OSTEOPATHY



DIAGNOSIS



EXAMINATION FOR PAIN



RESPONSE TO DIAGNOSTIC
ANALGESIA



EXAMINATION FOR HOOF BALANCE



IMAGING OF THE EQUINE DIGIT

EXAMINATION FOR PAIN

MANIPULATIVE TESTS



HOOF TESTERS



DISTAL LIMB FLEXION



FROG WEDGE TEST



TOE WEDGE TEST

HOOF EXAMINATION



HOOF EXAMINATION



HOOF EXAMINATION



HOOF EXAMINATION



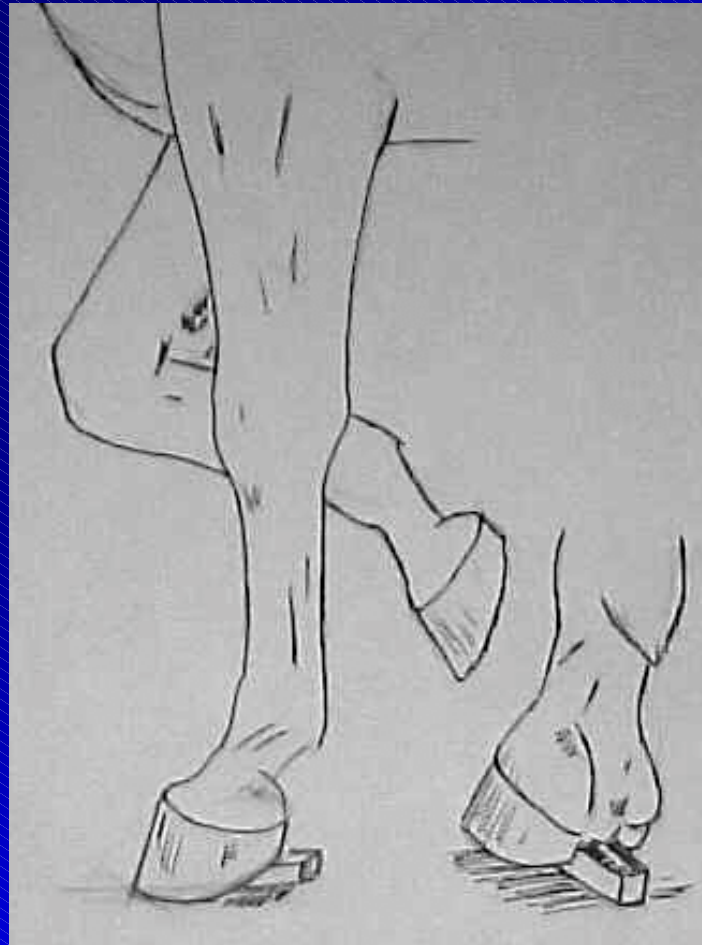
HOOF EXAMINATION



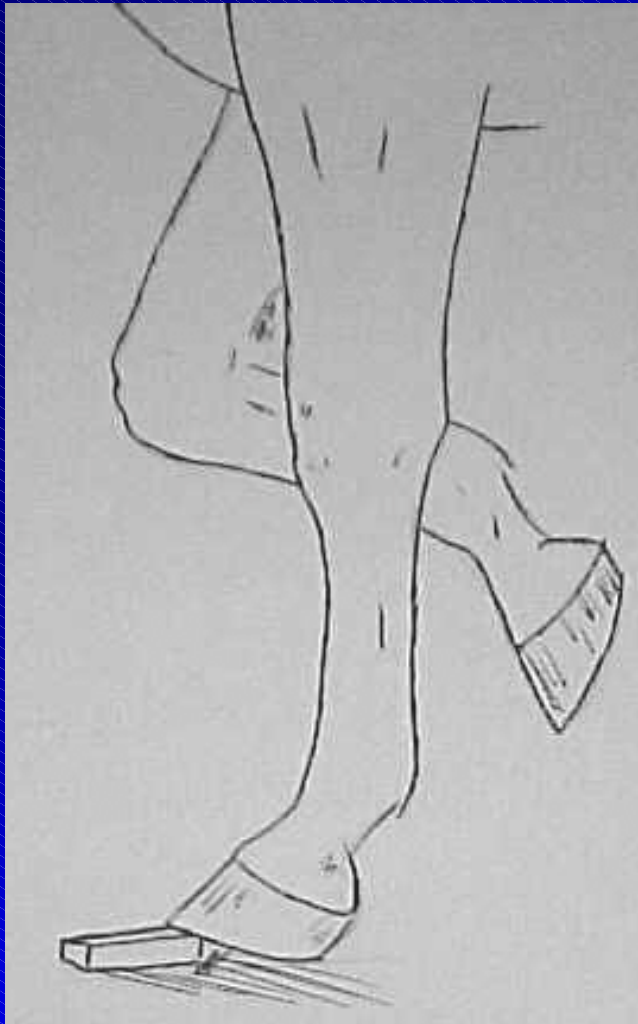
HOOF EXAMINATION



HOOF EXAMINATION



HOOF EXAMINATION



PAIN

- SENSORY NERVE SUPPLY OF THE NAVICULAR BONE
- ✓ IMPAR LIGAMENT
- ✓ COLLATERAL SESAMOIDEAN LIGAMENT



REGIONAL ANALGESIA and the LAMENESS EXAM

-  **REGIONAL ANALGESIA WILL PROVIDE
THE EVIDENCE TO LOCALIZE THE
REGION OF PAIN**
-  **THE PERFORMANCE OF REGIONAL
ANALGESIA NEEDS TO BE PERFORMED
IN A LOGICAL MANNER**

INTRA-ARTICULAR vs REGIONAL ANALGESIA

 **INTRA-ARTICULAR INJECTIONS
ANESTHETIZE JOINT REGIONS**

 **REGIONAL ANALGESIA DESENSITIZES
SKIN SEGMENTS**

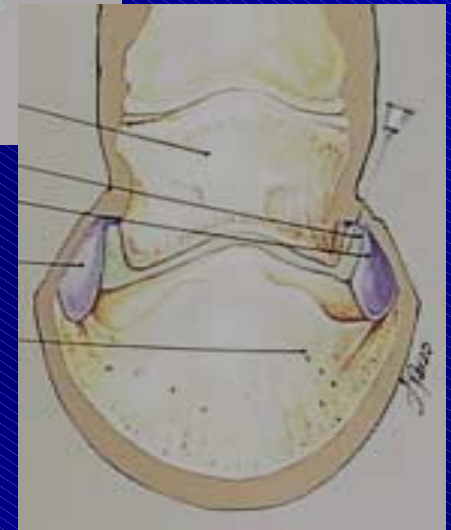
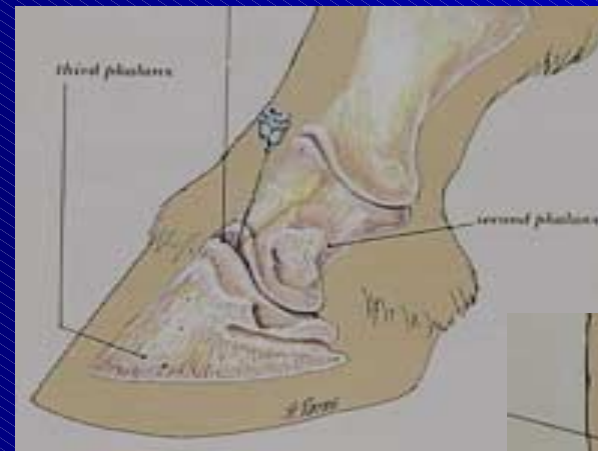
 **INTRA-ARTICULAR INJECTION IS
MORE SPECIFIC AND DOES NOT
INTERFERE WITH REGIONAL
ANALGESIA**

DISTAL INTERPHALANGEAL JOINT ANALGESIA

TWO APPROACHES

☞ DORSAL

☞ LATERAL

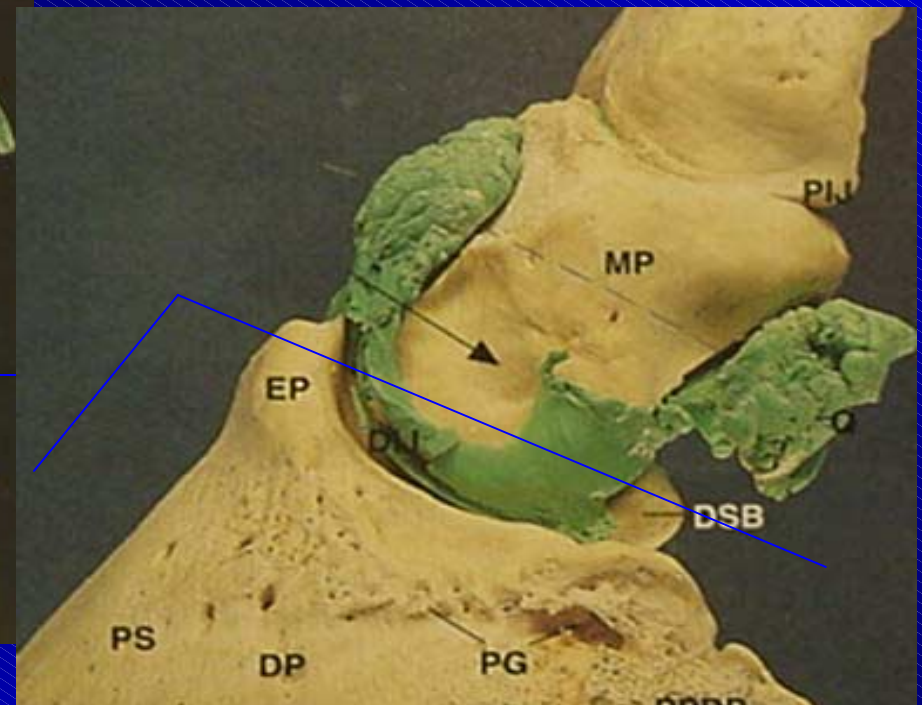
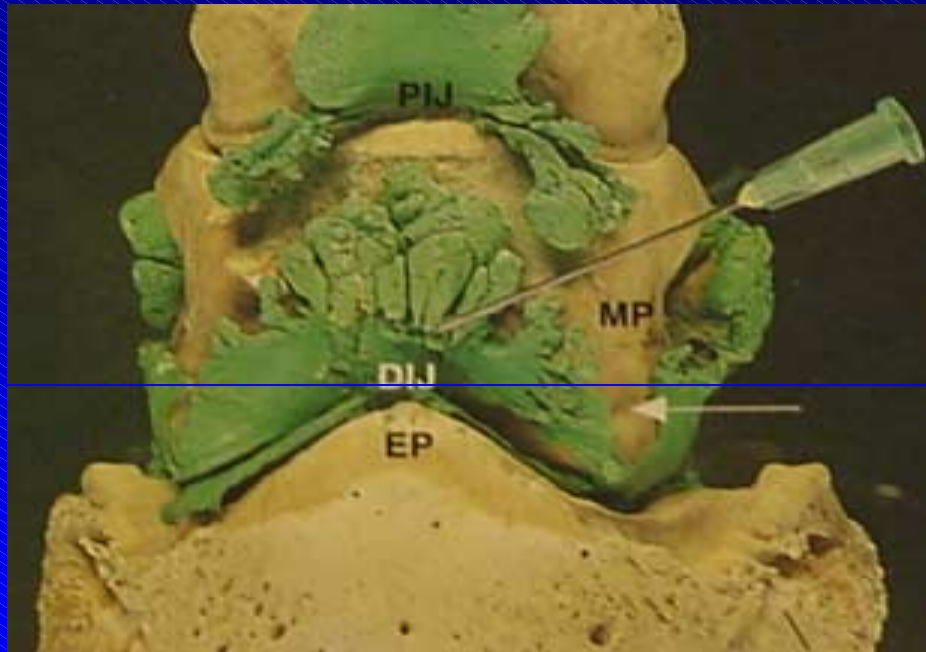


DORSAL APPROACH

- ☞ TAKE ADVANTAGE OF THE SIZE OF THE POUCH
- ☞ STAY ABOVE THE CORONARY BAND
- ☞ NOT NECESSARY TO GET BETWEEN THE BONES
- ☞ INJECT 6-10 ml



DORSAL APPROACH

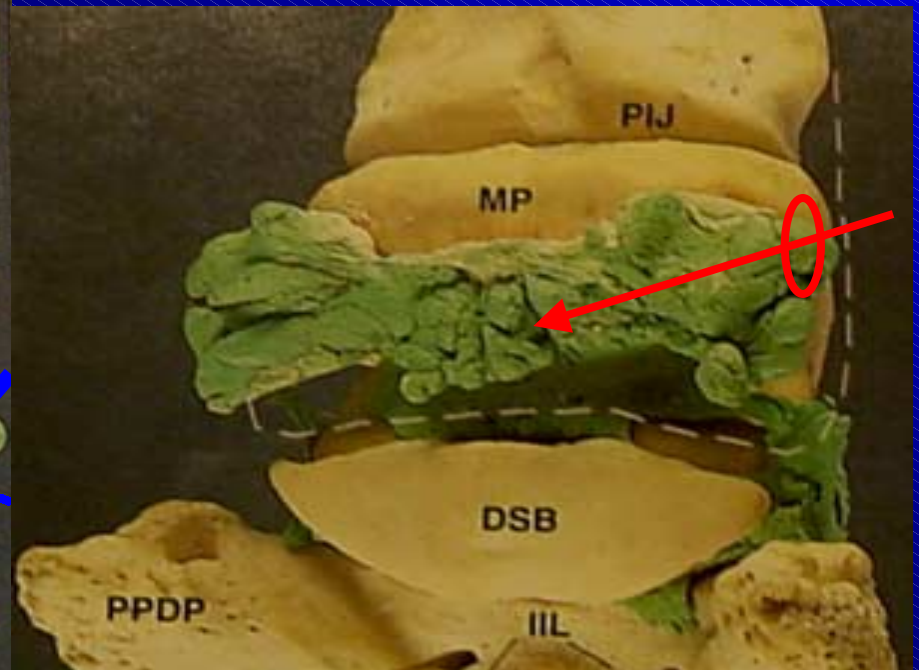
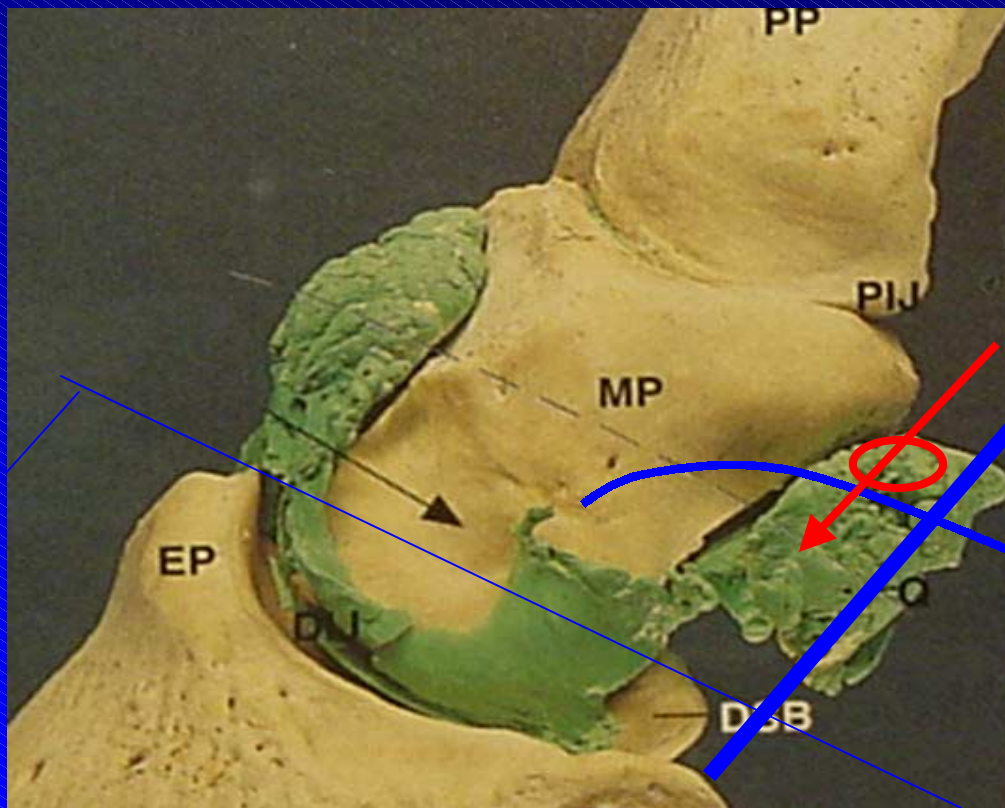


LATERAL APPROACH

- ➡ **PALPATE THE PALMAR
EDGE OF P2**
- ➡ **PALPATE THE DDFT**
- ➡ **PALPATE THE
PROXIMAL ASPECT OF
THE COLLATERAL
CARTILAGE**
- ➡ **INJECT 6-10 ml**

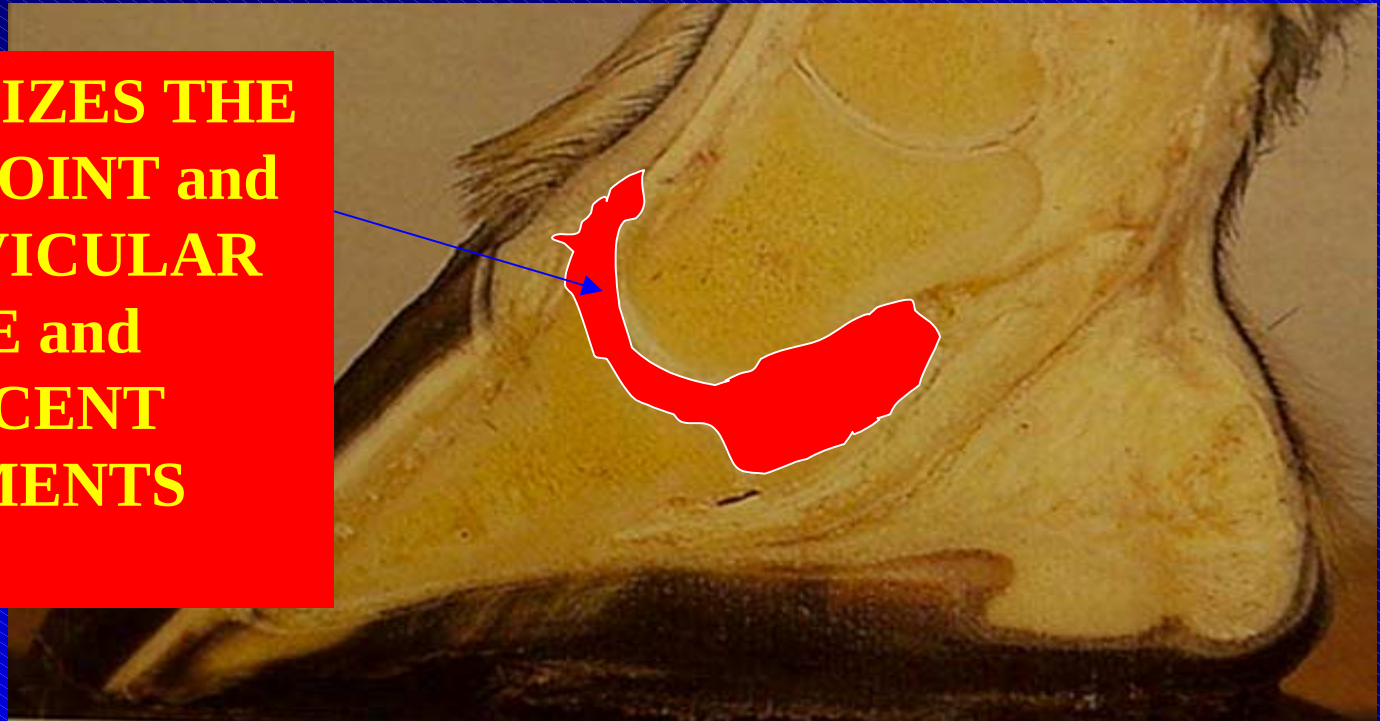


LATERAL APPROACH



DISTAL INTERPHALANGEAL JOINT ANALGESIA

**DESENSITIZES THE
COFFIN JOINT and
THE NAVICULAR
BONE and
ADJACENT
LIGAMENTS**



PALMAR DIGITAL NERVE ANALGESIA

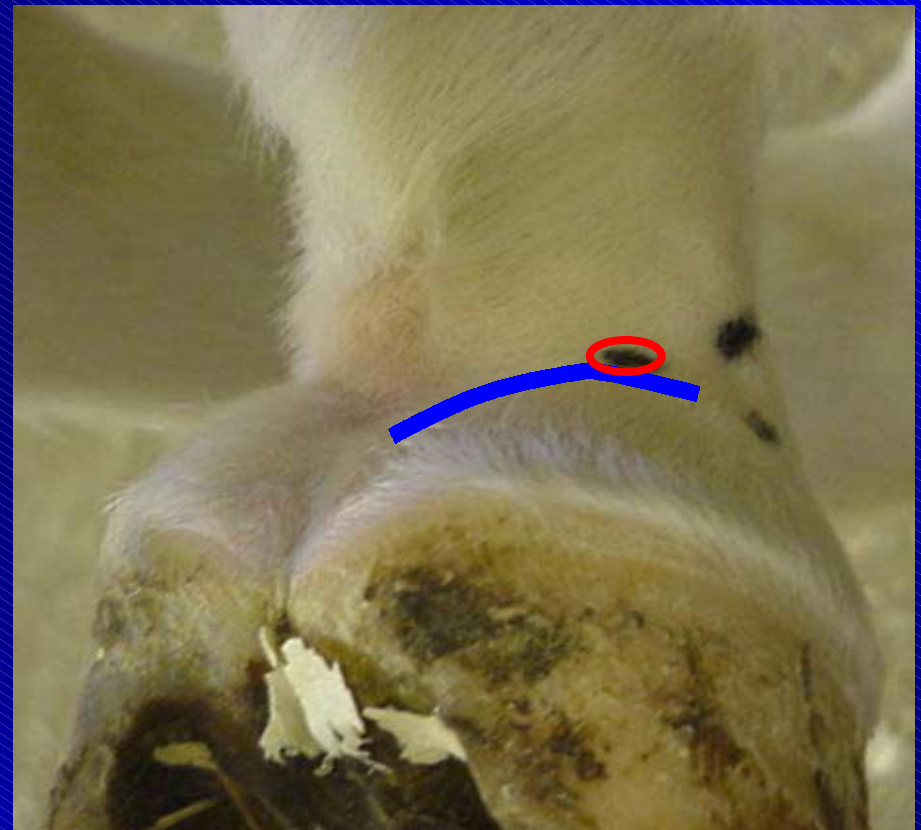
CONSIDERATIONS:

- ① USE AS SMALL OF
NEEDLE AS POSSIBLE
- ② INSERT THE NEEDLE AS
DISTAL AS POSSIBLE
- ③ USE AS SMALL OF
VOLUME AS POSSIBLE
1.5-2 ml



PALMAR DIGITAL NERVE ANALGESIA

- ➡ PALPATE THE COLLATERAL CARTILAGE
- ➡ THE NERVE CAN BE PALPATED AT THE INTERSECTION OF THE CARTILAGE AND PASTER



PALMAR DIGITAL NERVE ANALGESIA



PODOTROCHLEAR BURSA

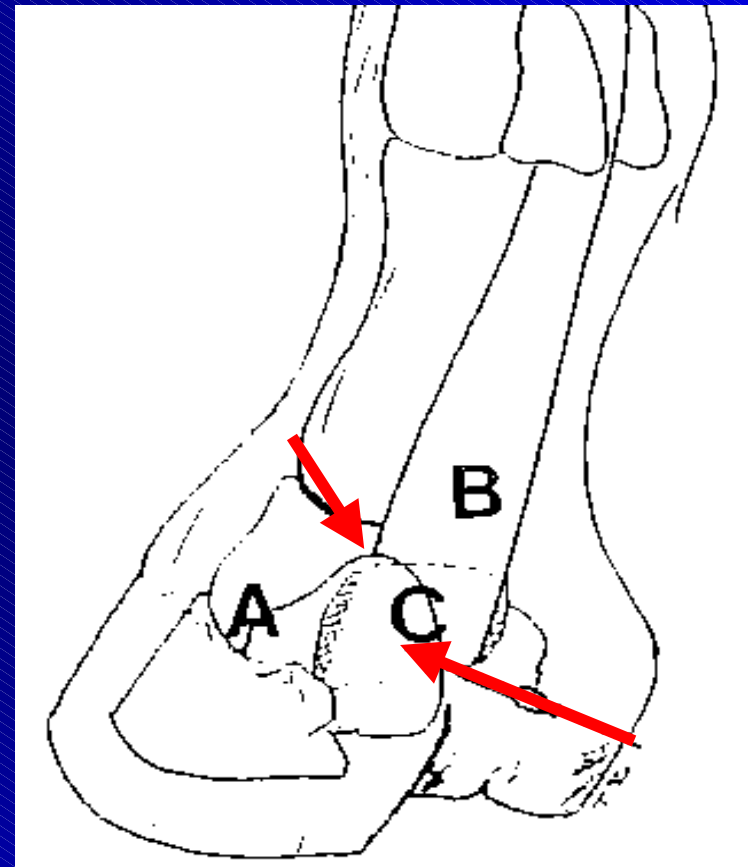
TWO APPROACHES



PALMAR



LATERAL



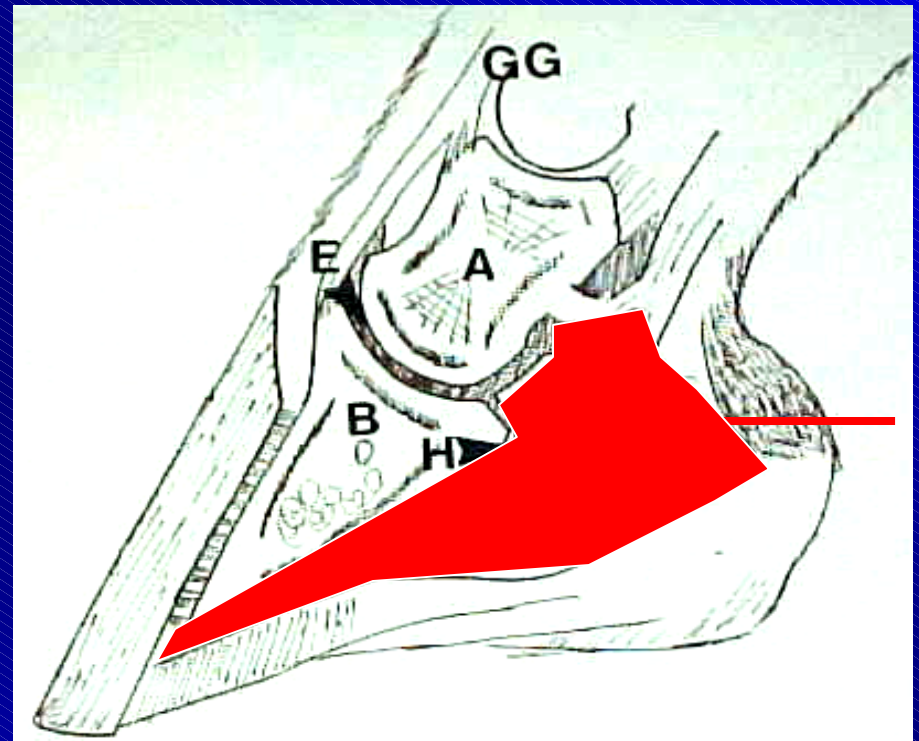
PODOTROCHLEAR BURSA

INJECTION INTO THE
BURSA

DESENSITIZES THE

☞ NAVICULAR
REGION

☞ SOLAR REGION



PALMAR FOOT PAIN

ANALGESIC GROUPS

- **>90% DIP JOINT; >90% PB BURSA**
- **>90% DIP JOINT; NO EFFECT PB BURSA**
- **NO EFFECT DIP JOINT; >90% PB BURSA**
- **SOME EFFECT BY EITHER DIP or PB BURSA**
- **NO EFFECT BY EITHER DIP or PB BURSA**



PALMAR FOOT PAIN ANALGESIC GROUPS

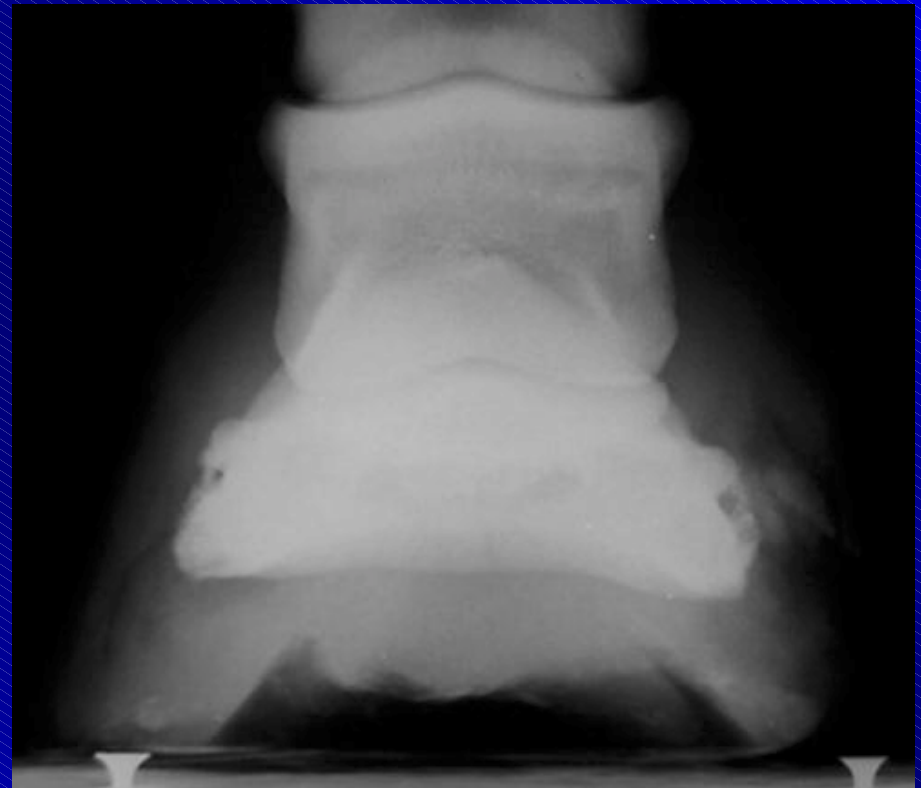
- NAVICULAR PAIN
- DIP JOINT PAIN
- SOLAR P3/ insertional
DDFT
- MIXED PAIN
- PALMAR PAIN



RADIOGRAPHY

5 RADIOGRAPHIC PROJECTIONS:

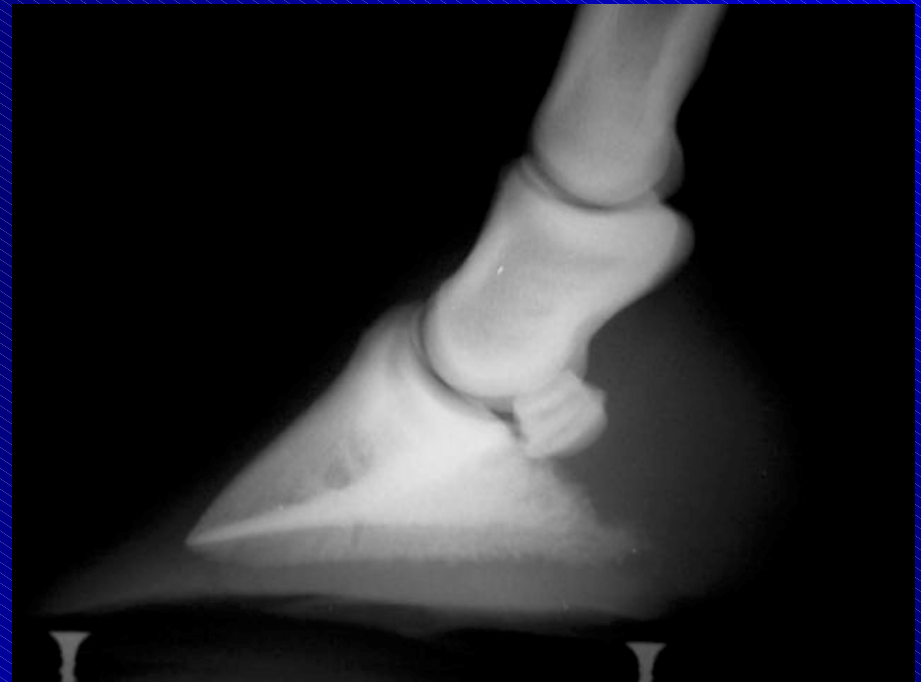
- **DORSOPALMAR**
- **LATEROMEDIAL**
- **DORSOSOLAR P3**
- **DORSO SOLAR NAVICULAR**
- **FLEXOR PROJECTION**



RADIOGRAPHY

5 RADIOGRAPHIC PROJECTIONS:

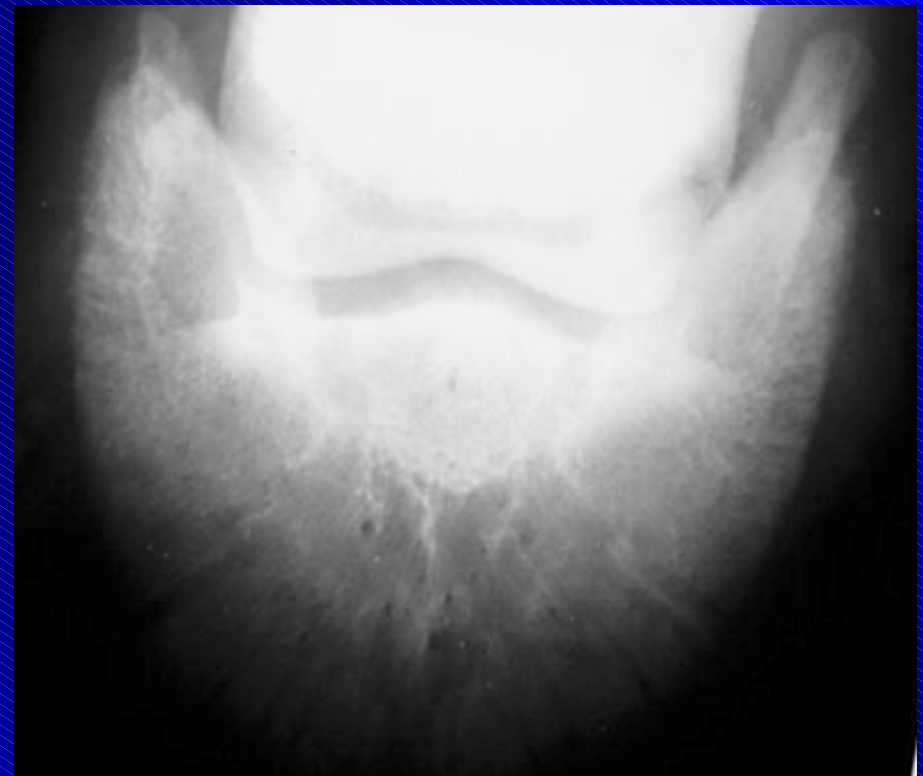
- DORSOPALMAR
- **LATEROMEDIAL**
- DORSOSOLAR P3
- DORSO SOLAR NAVICULAR
 - FLEXOR PROJECTION



RADIOGRAPHY

5 RADIOGRAPHIC PROJECTIONS:

- DORSOPALMAR
- LATEROMEDIAL
- DORSOSOLAR P3
- DORSO SOLAR NAVICULAR
 - FLEXOR PROJECTION



RADIOGRAPHY

5 RADIOGRAPHIC PROJECTIONS:

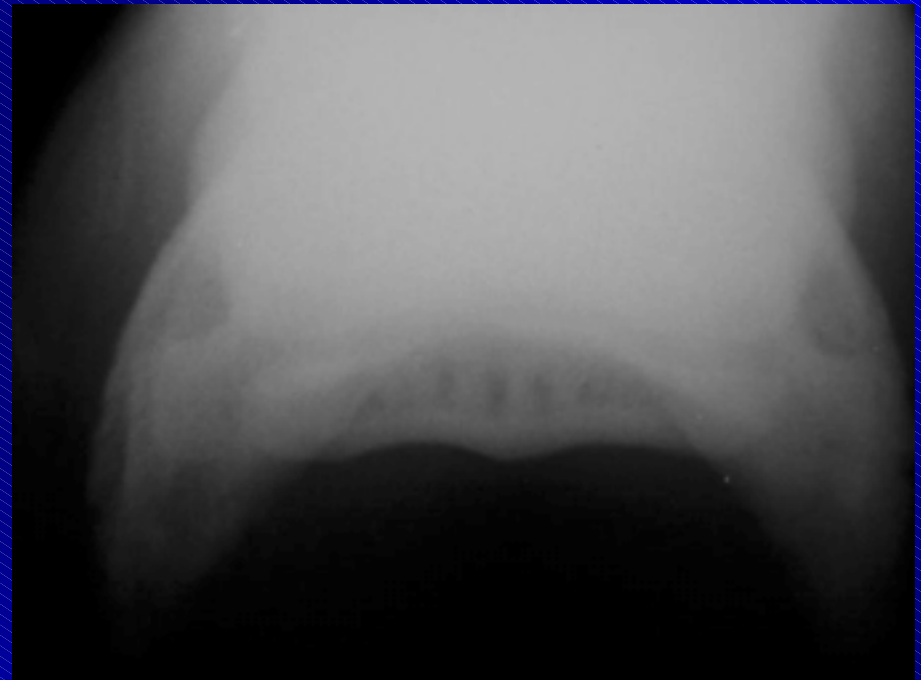
- DORSOPALMAR
- LATEROMEDIAL
- DORSOSOLAR P3
- DORSO SOLAR NAVICULAR
- FLEXOR PROJECTION



RADIOGRAPHY

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- LATEROMEDIAL
- DORSOSOLAR P3
- DORSO SOLAR NAVICULAR
- FLEXOR PROJECTION



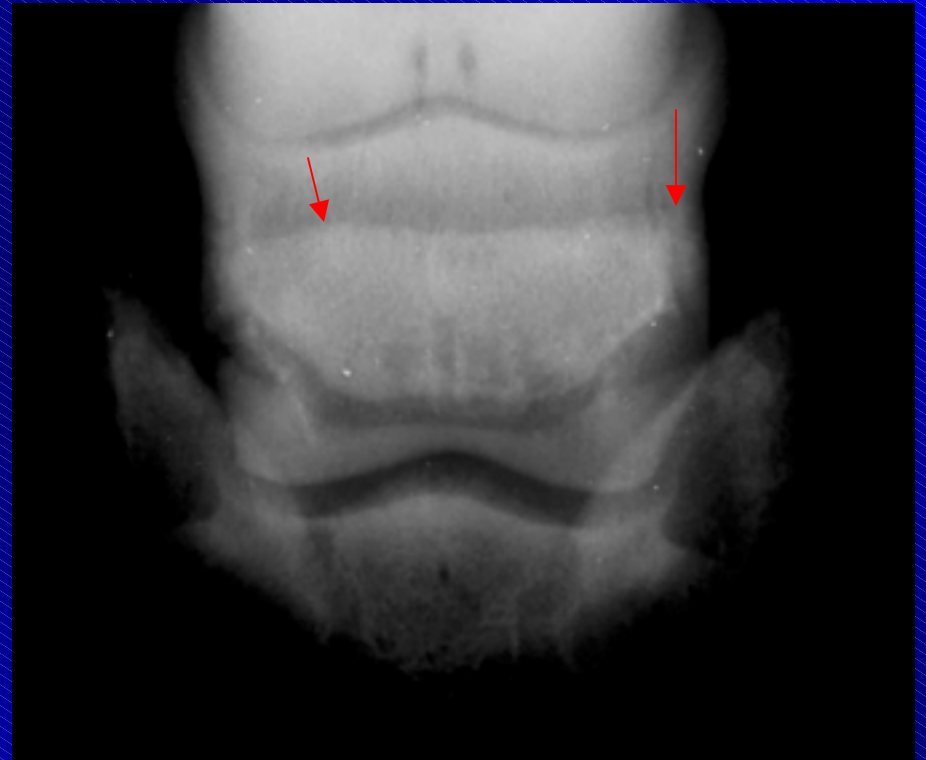
RADIOGRAPHIC CHANGES

- **ENLARGED
SYNOVIAL FOSSA**
- **ENTHESOPHYTES**
- **FLEXOR CORTEX
CHANGES**
- **CYST-LIKE
FORMATIONS**
- **MEDULLARY
SCLEROSIS**



RADIOGRAPHIC CHANGES

- ENLARGED SYNOVIAL FOSSA
- **ENTHESOPHYTES**
- FLEXOR CORTEX CHANGES
- CYST-LIKE FORMATIONS
- MEDULLARY SCLEROSIS



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- CYST-LIKE
FORMATIONS
- MEDULLARY
SCLEROSIS



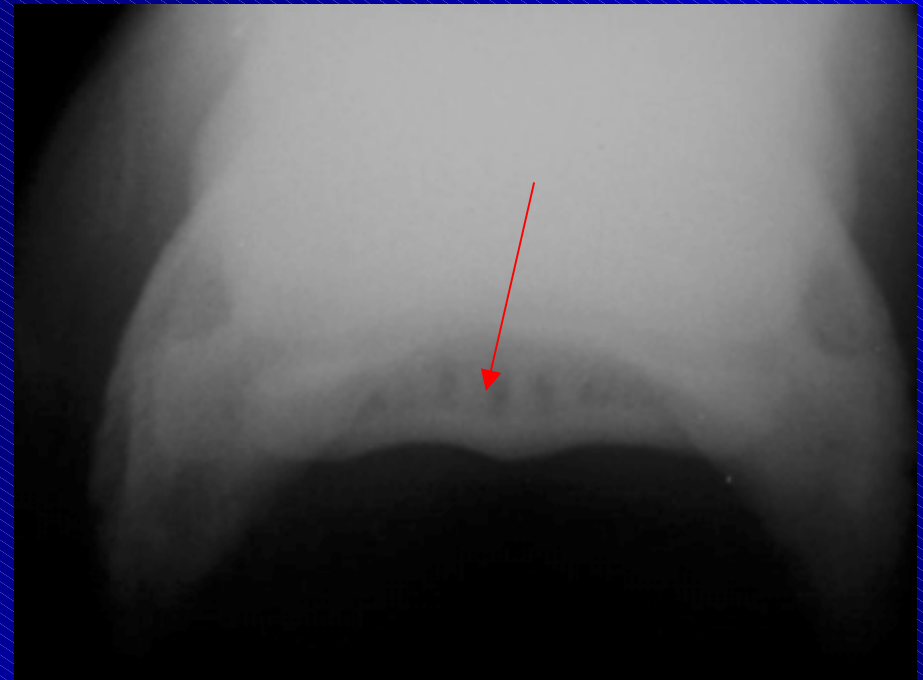
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- MEDULLARY SCLEROSIS



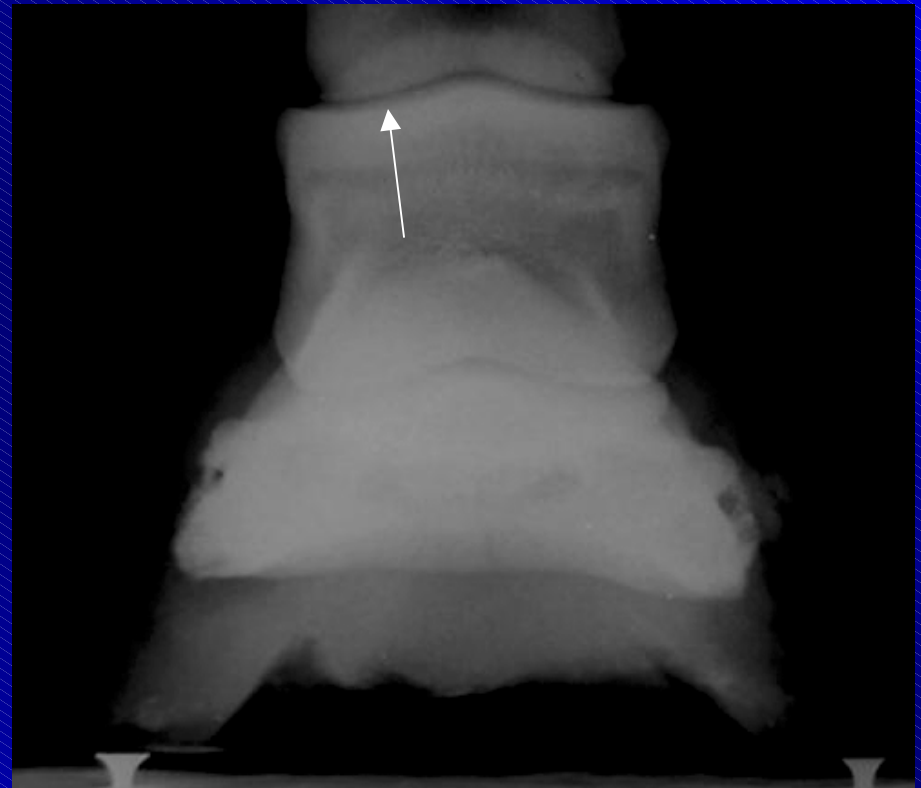
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- ENLARGED
SYNOVIAL FOSSA
- ENTHESOPHYTES
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FORMATIONS
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SCLEROSIS



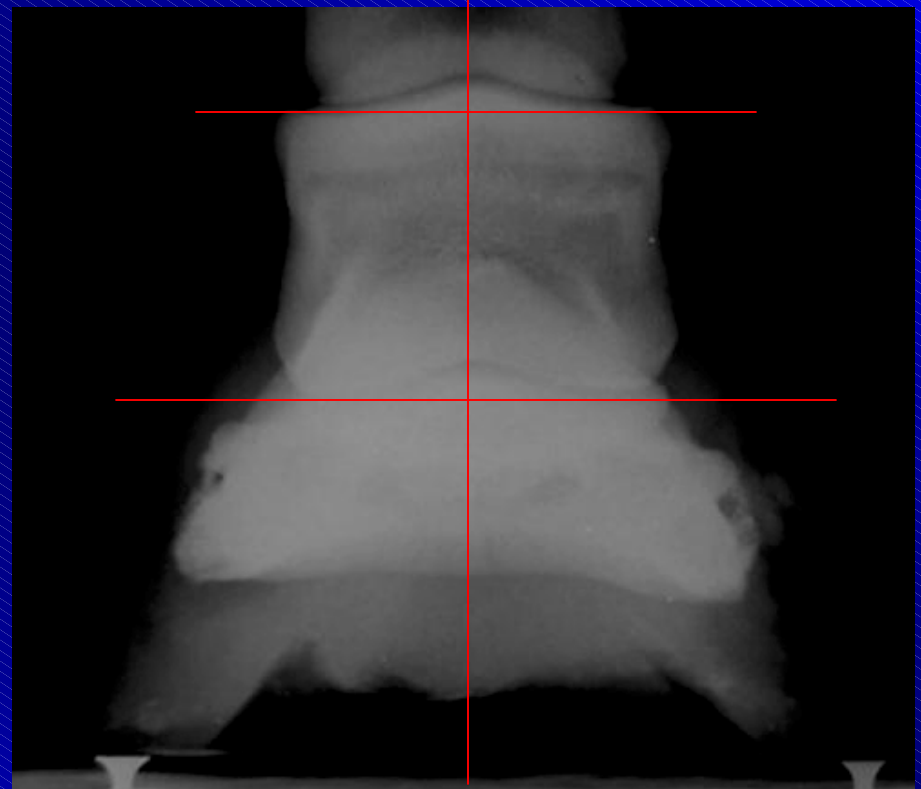
DORSOPALMAR PROJECTION

- **JOINT SURFACES**
- **JOINT ALIGNMENT**
- **OSSEOUS CHANGES**
- **HOOF CAPSULUE:
BONEY COLUMN**
- **MEDIAL-LATERAL
HOOF BALANCE**



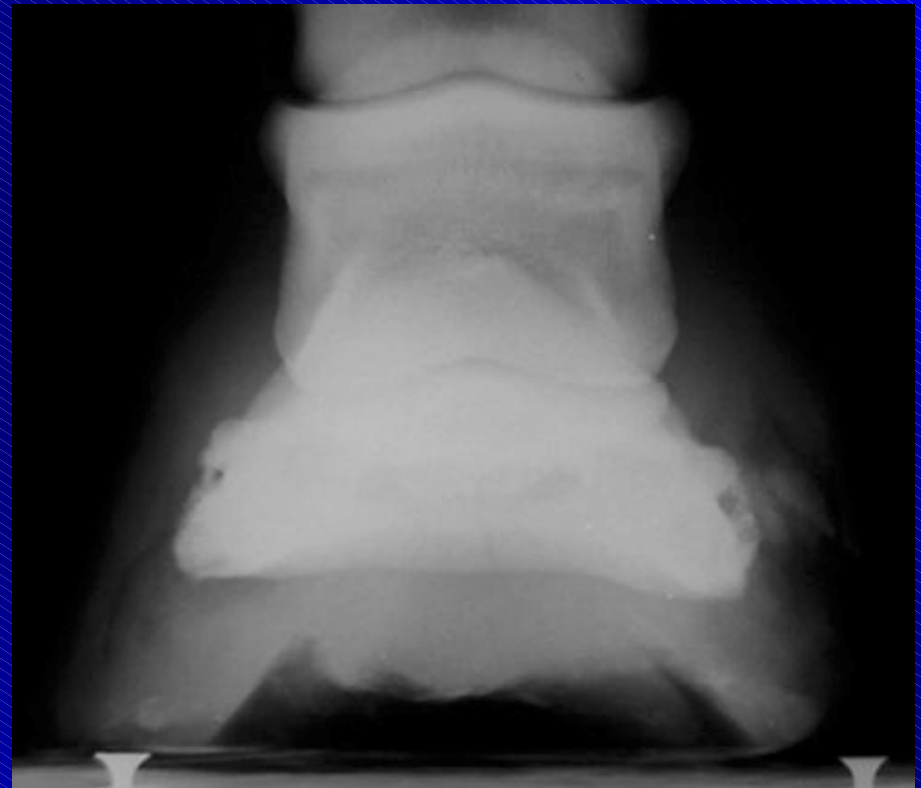
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HOOF BALANCE



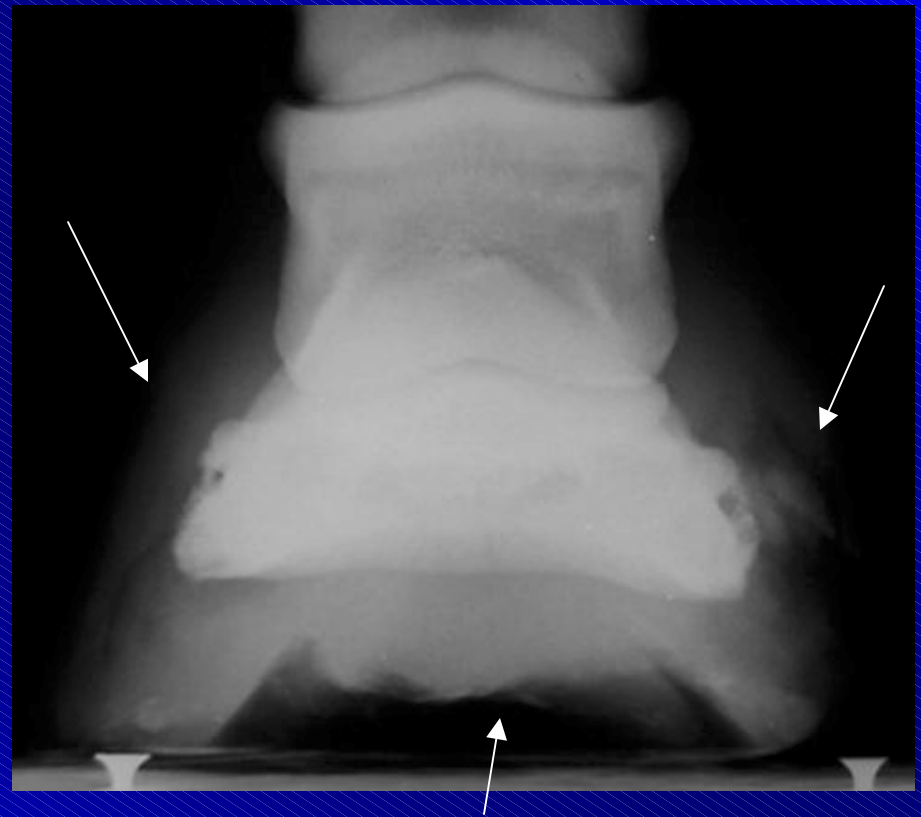
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HOOF BALANCE



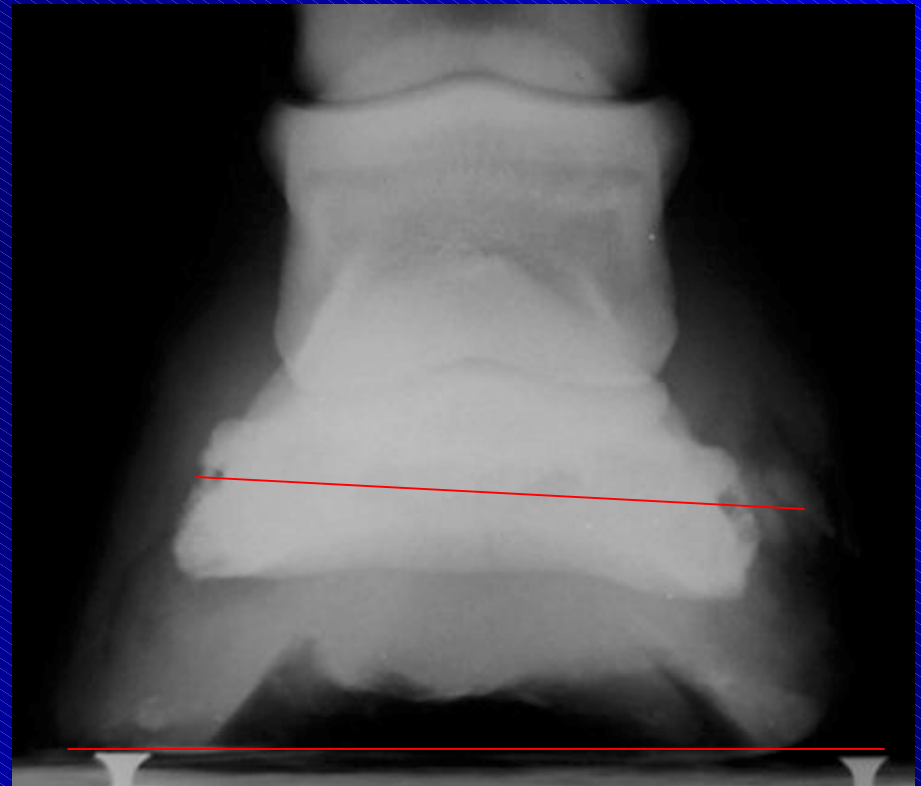
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- OSSEOUS CHANGES
- **HOOF CAPSULUE:
BONEY COLUMN**
- MEDIAL-LATERAL
HOOF BALANCE



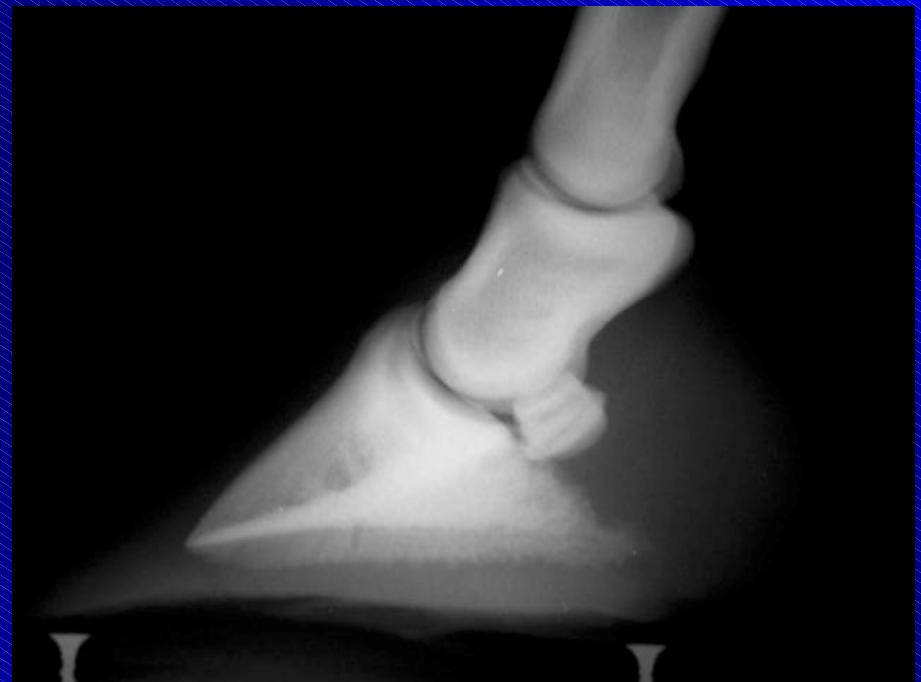
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BONEY COLUMN
- MEDIAL-LATERAL
HOOF BALANCE



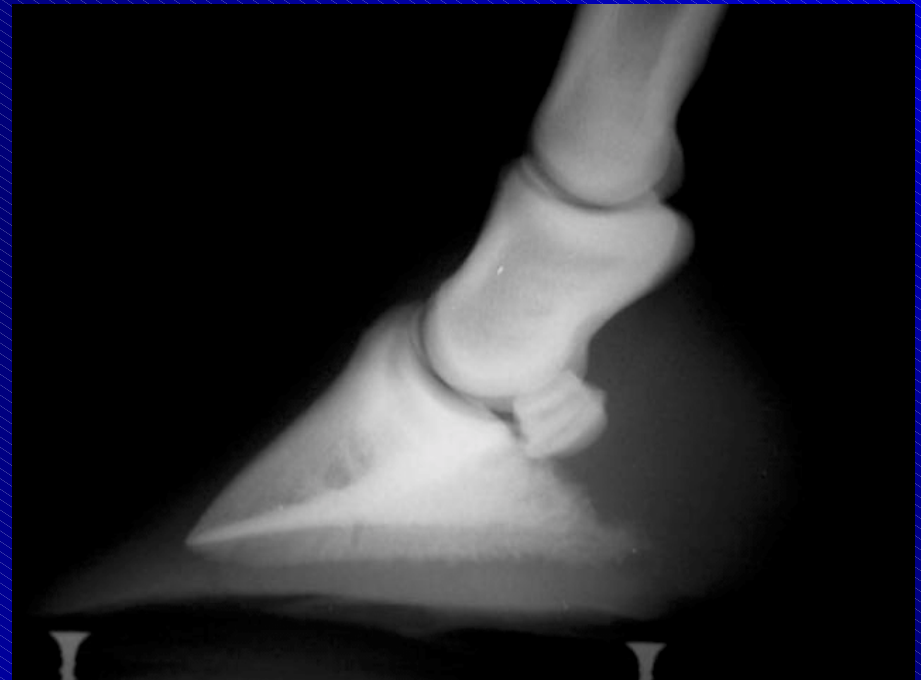
LATERAL to MEDIAL PROJECTION

- **JOINT SURFACES**
- **OSSEOUS CHANGES**
 - **NAVICULAR CHANGES**
- **HOOF PASTERNAxis**
- **HOOF CAPSULE:
BONEY COLUMN**



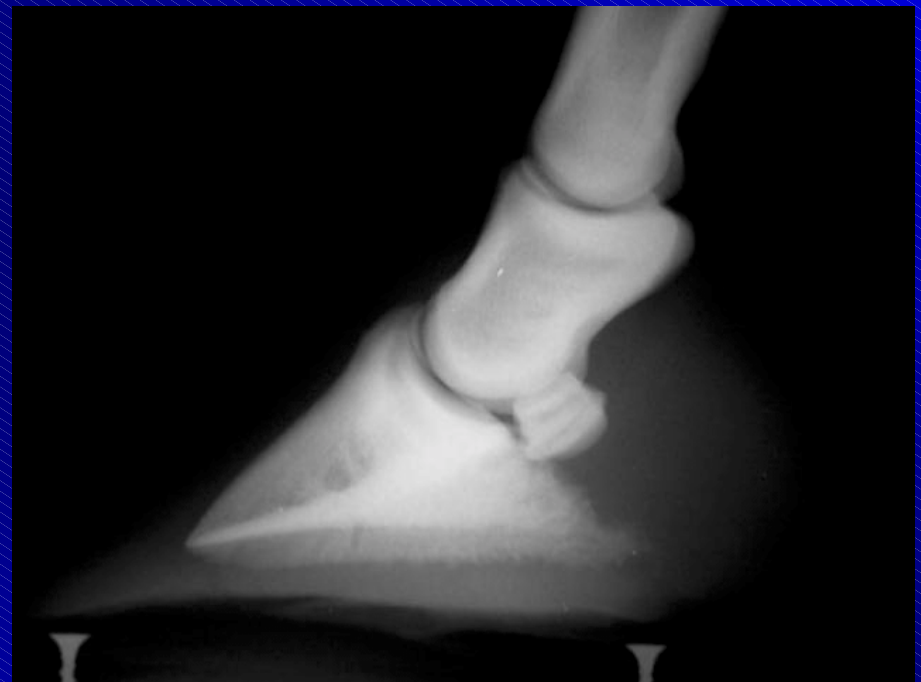
LATERAL to MEDIAL PROJECTION

- JOINT SURFACES
- OSSEOUS CHANGES
 - NAVICULAR CHANGES
- HOOF PASTERNAxis
- HOOF CAPSULE:
BONEY COLUMN



LATERAL to MEDIAL PROJECTION

- JOINT SURFACES
- OSSEOUS CHANGES
 - NAVICULAR CHANGES
- HOOF PASTERNA
AXIS
- HOOF CAPSULE:
BONEY COLUMN



LATERAL to MEDIAL PROJECTION

- JOINT SURFACES
- OSSEOUS CHANGES
 - NAVICULAR CHANGES
- **HOOF PASTERNA
AXIS**
- HOOF CAPSULE:
BONEY COLUMN



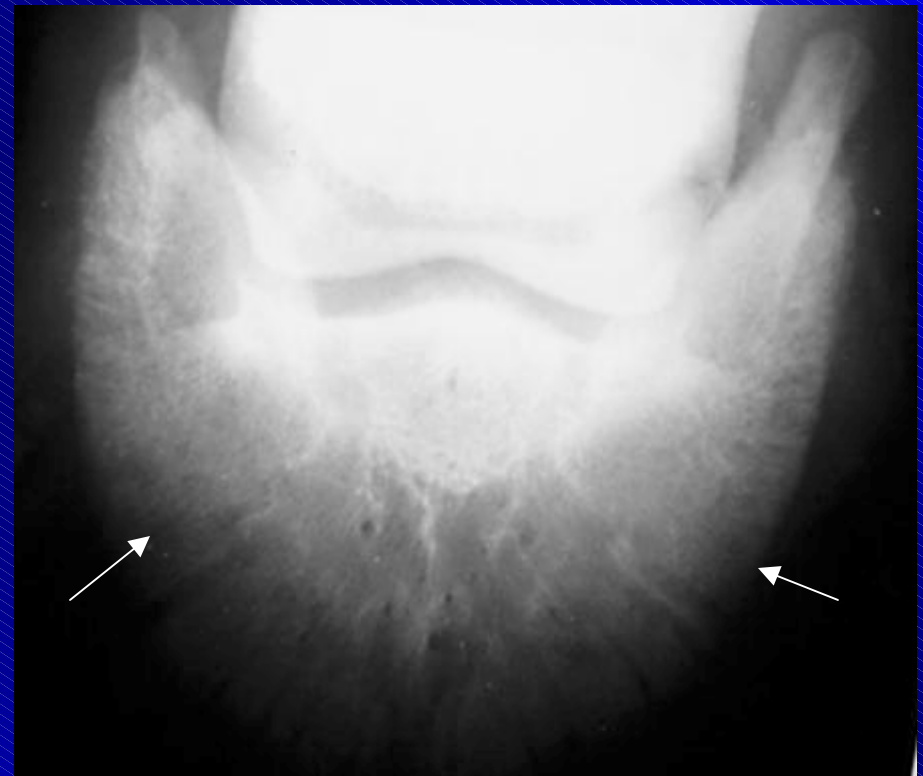
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 - NAVICULAR CHANGES
- HOOF PASTERNAxis
- HOOF CAPSULE:
BONEY COLUMN



DORSOSOLAR THIRD PHALANX

- **ASSESS WEIGHT BEARING MARGIN**
- **ASSESS VASCULAR CHANNELS**
- **ASSESS THIRD PHALANX ARCHITECTURE**



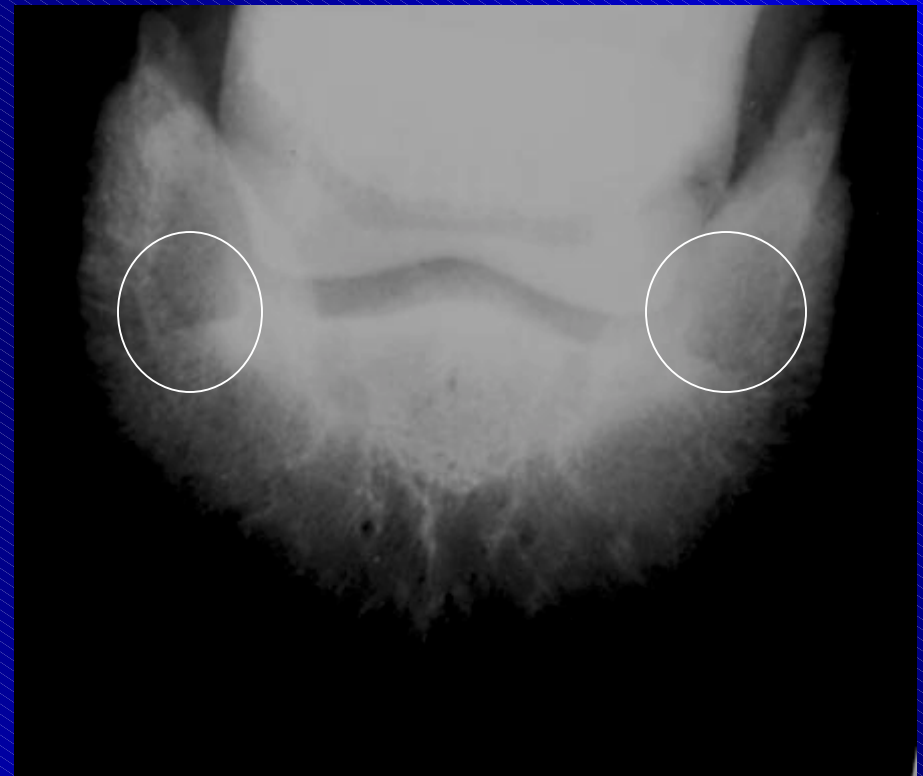
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- ASSESS WEIGHT BEARING MARGIN
- ASSESS VASCULAR CHANNELS
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DORSOSOLAR THIRD PHALANX

- ASSESS WEIGHT BEARING MARGIN
- ASSESS VASCULAR CHANNELS
- ASSESS THIRD PHALANX ARCHITECTURE



DORSOSOLAR NAVICULAR BONE

- **ASSESS PROXIMAL
and DISTAL
BORDERS of the
NAVICULAR BONE**
- **ASSESS SYNOVIAL
FOSSA**
- **ASSESS NAVICULAR
ARCHITECTURE**



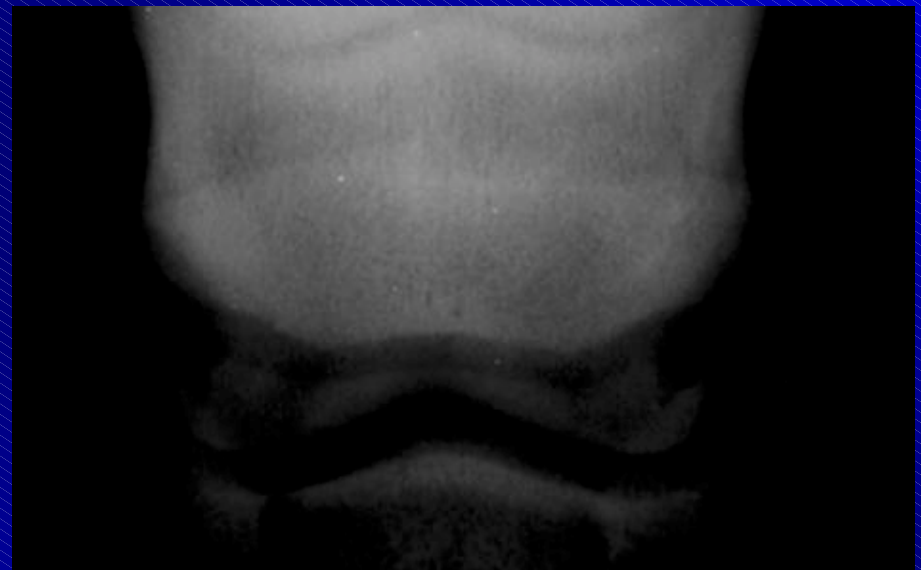
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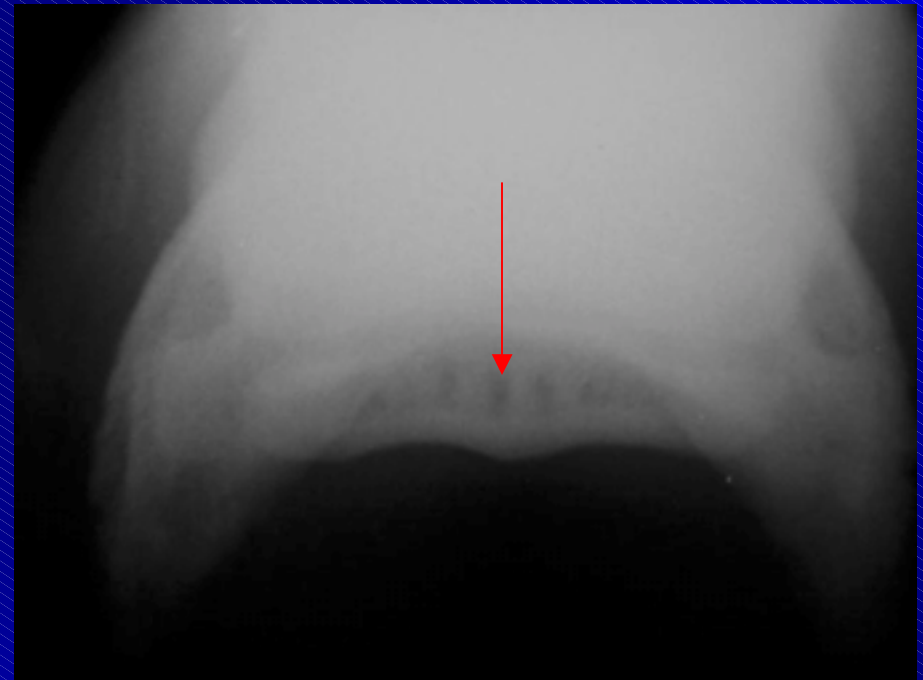
FLEXOR PROJECTION

- **FLEXOR SURFACE of the NAVICULAR BONE**
- **ASSESS the MEDULLARY CAVITY of the NAVICULAR BONE**
- **ASSESS the WINGS of the THIRD PHALANX**



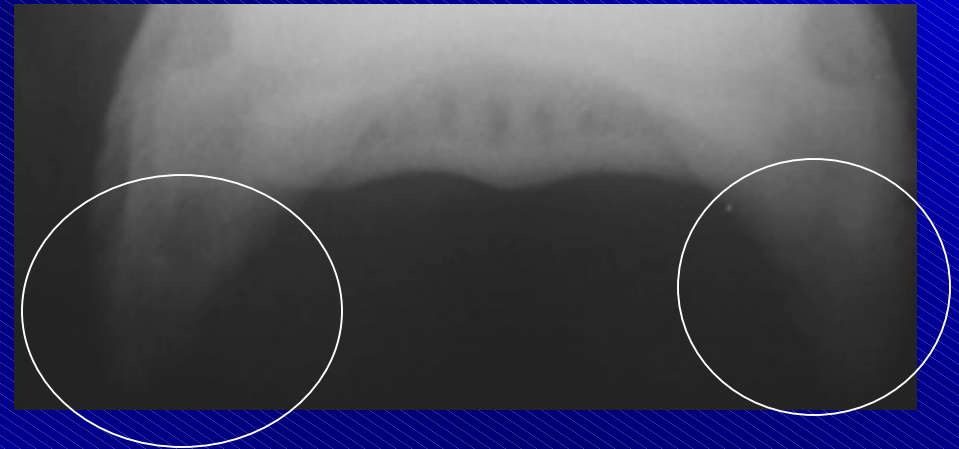
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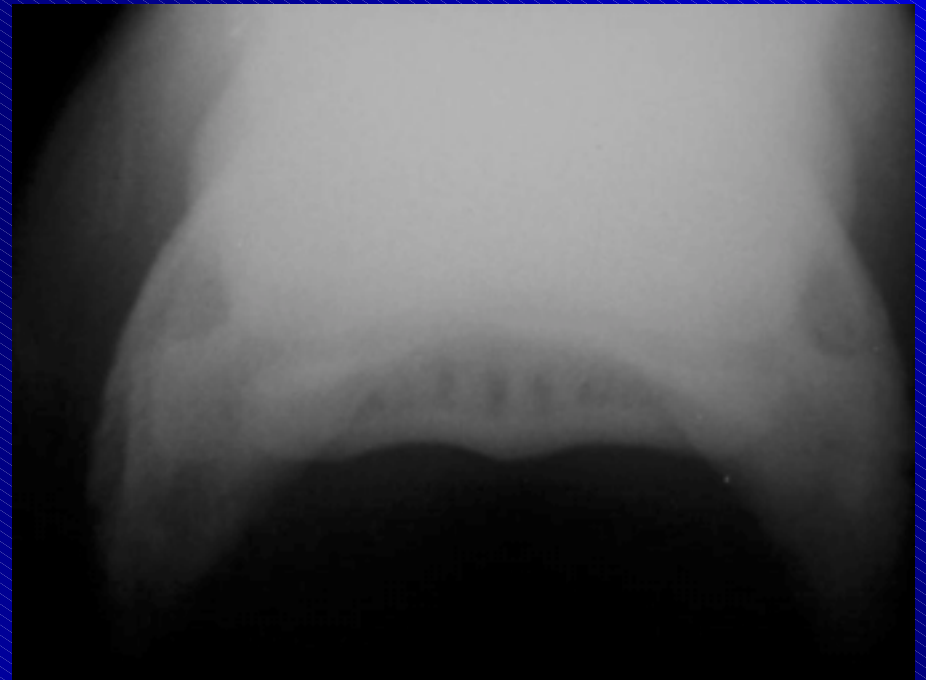
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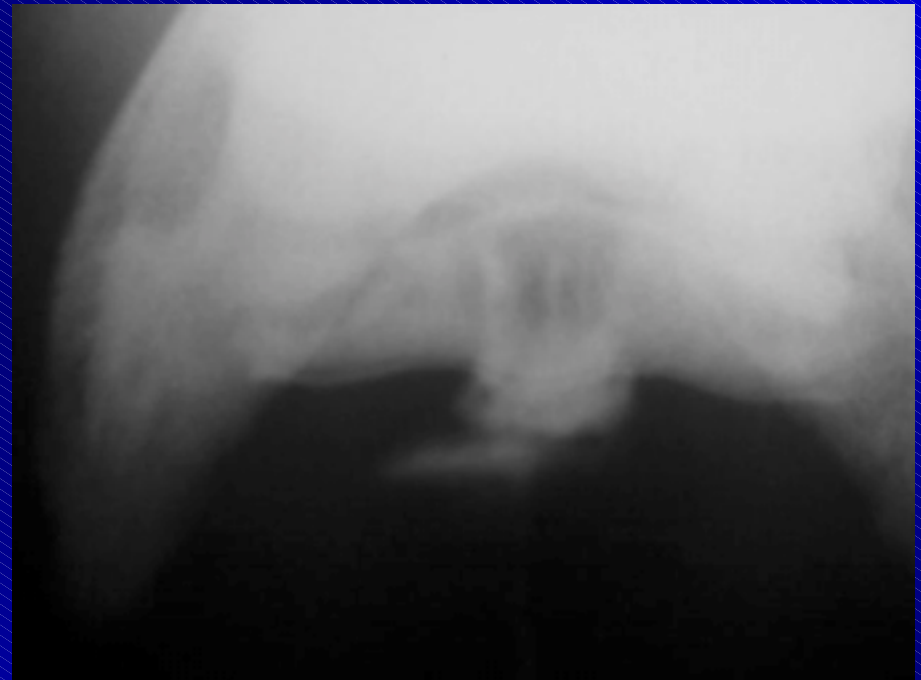
NAVICULAR RADIOGRAPHY

NAVICULAR
FIBROCARTILAGE,
NAVICULAR BURSA,
and DEEP FLEXOR
TENDON CANNOT BE
IMAGED ON PLAIN
RADIOGRAPHY



NAVICULAR BURSOGRAPHY

- **NORMAL CARTILAGE**
(13%)
- **THINNING or EROSIONS**
(69%)
- **CYST-LIKE LESIONS**
(2%)
- **DDFT FIBRILLATION**
(21%)
- **DIP-PB**
COMMUNICATION (3%)



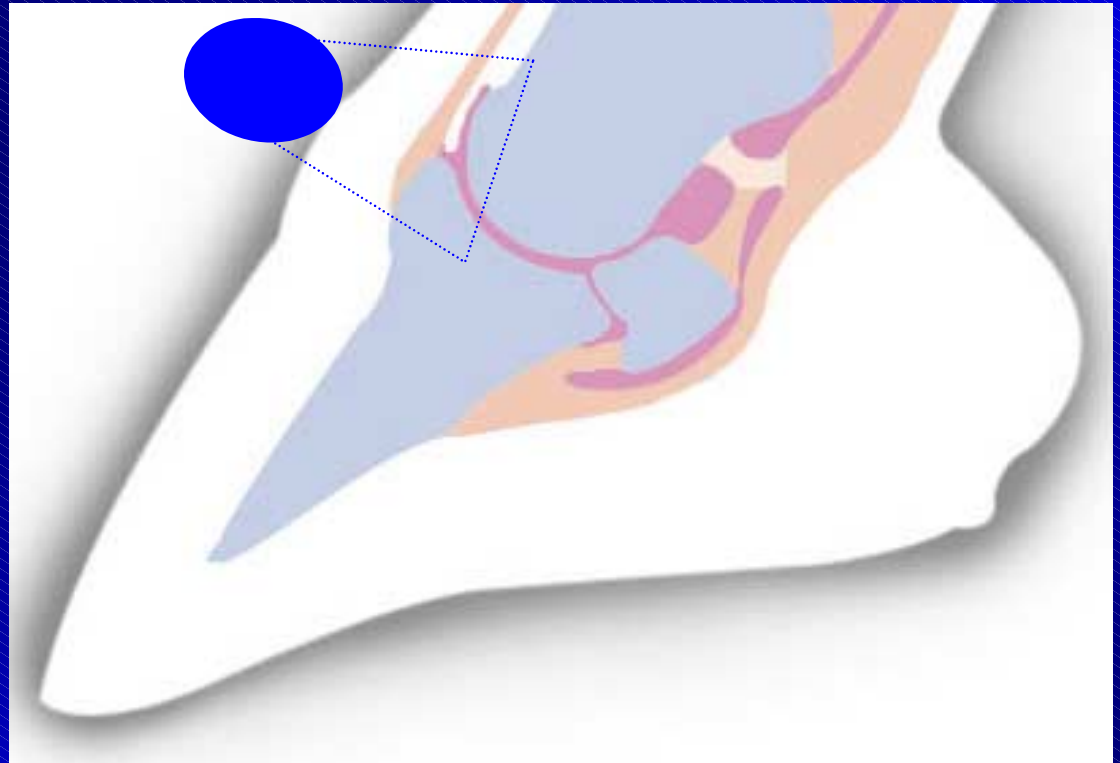
DISTAL INTERPHALANGEAL JOINT

- 10 MHz linear array transducer
- Coronary band
- Transverse and longitudinal planes



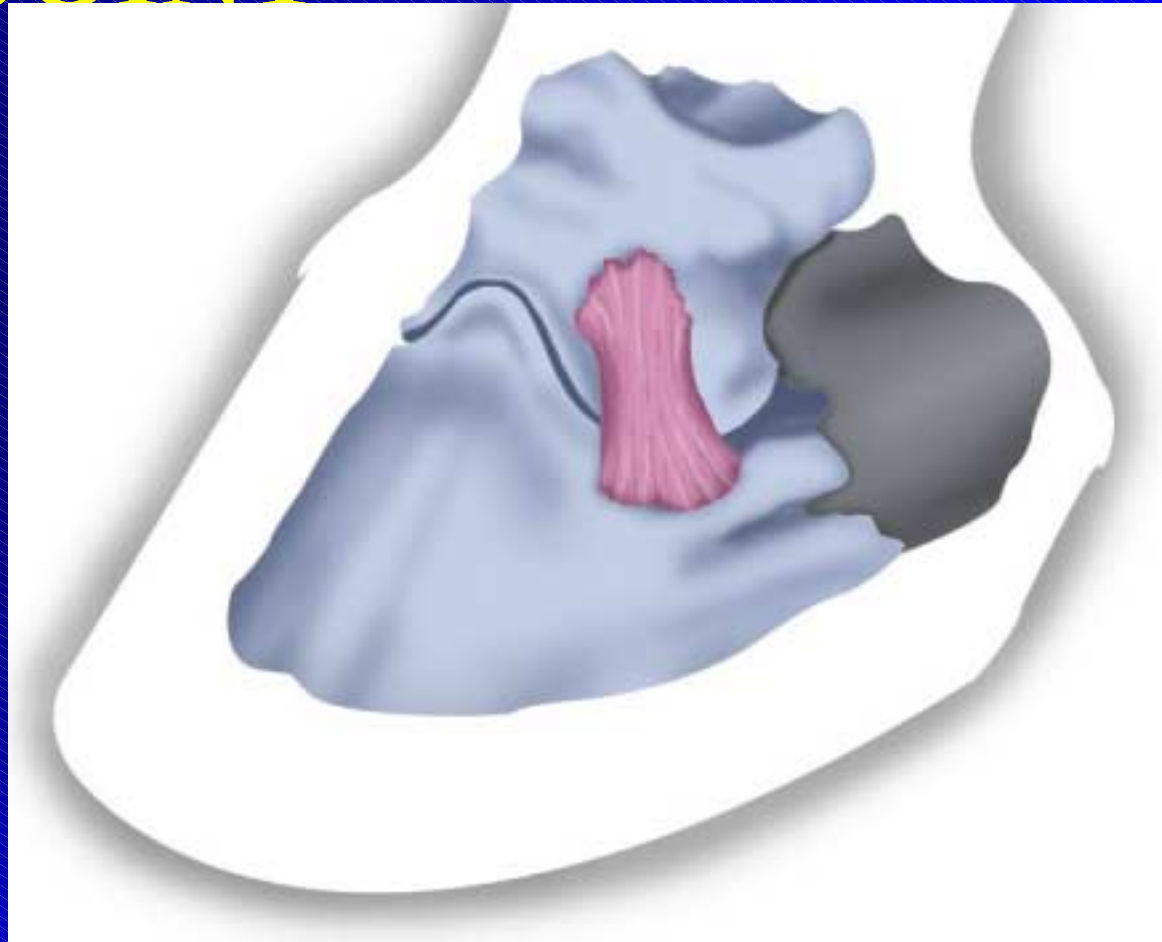
DISTAL INTERPHALANGEAL JOINT

- Thickness and length of dorsal pouch of the DIP joint



DISTAL INTERPHALANGEAL JOINT

- Cross sectional area of the medial and lateral collateral ligaments of the DIP joint



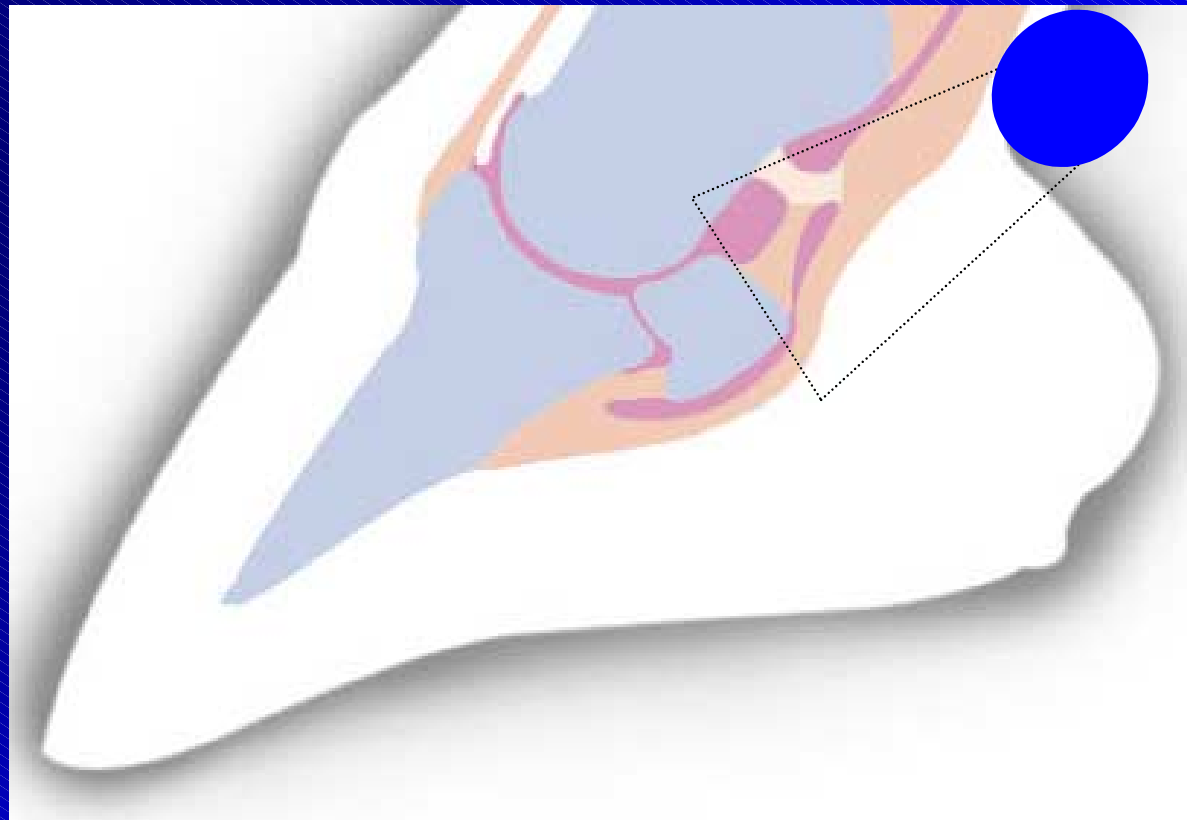
DEEP FLEXOR TENDON and HEEL BULBS

- 10 MHz microconvex linear array transducer
- Between heel bulbs
- Longitudinal plane



DEEP FLEXOR TENDON and HEEL BULBS

- Deep digital flexor tendon width
- Suspensory ligament of the navicular bone
- Proximal palmar pouch of the DIP joint
- Navicular bursa



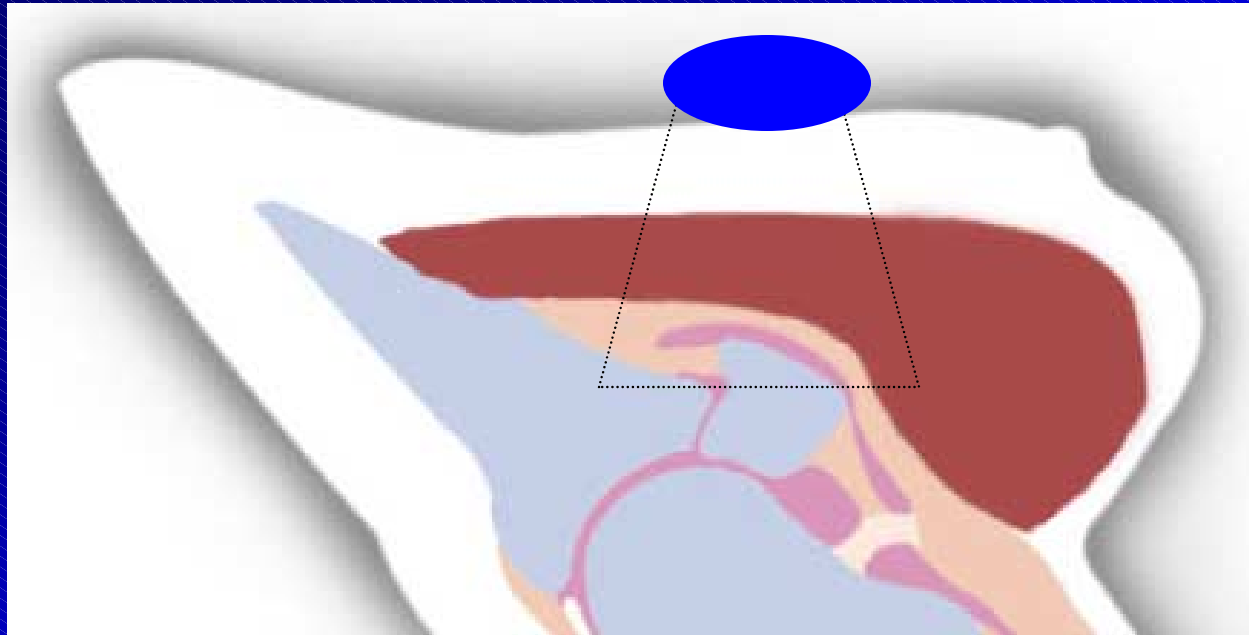
PODOTROCHLEAR REGION

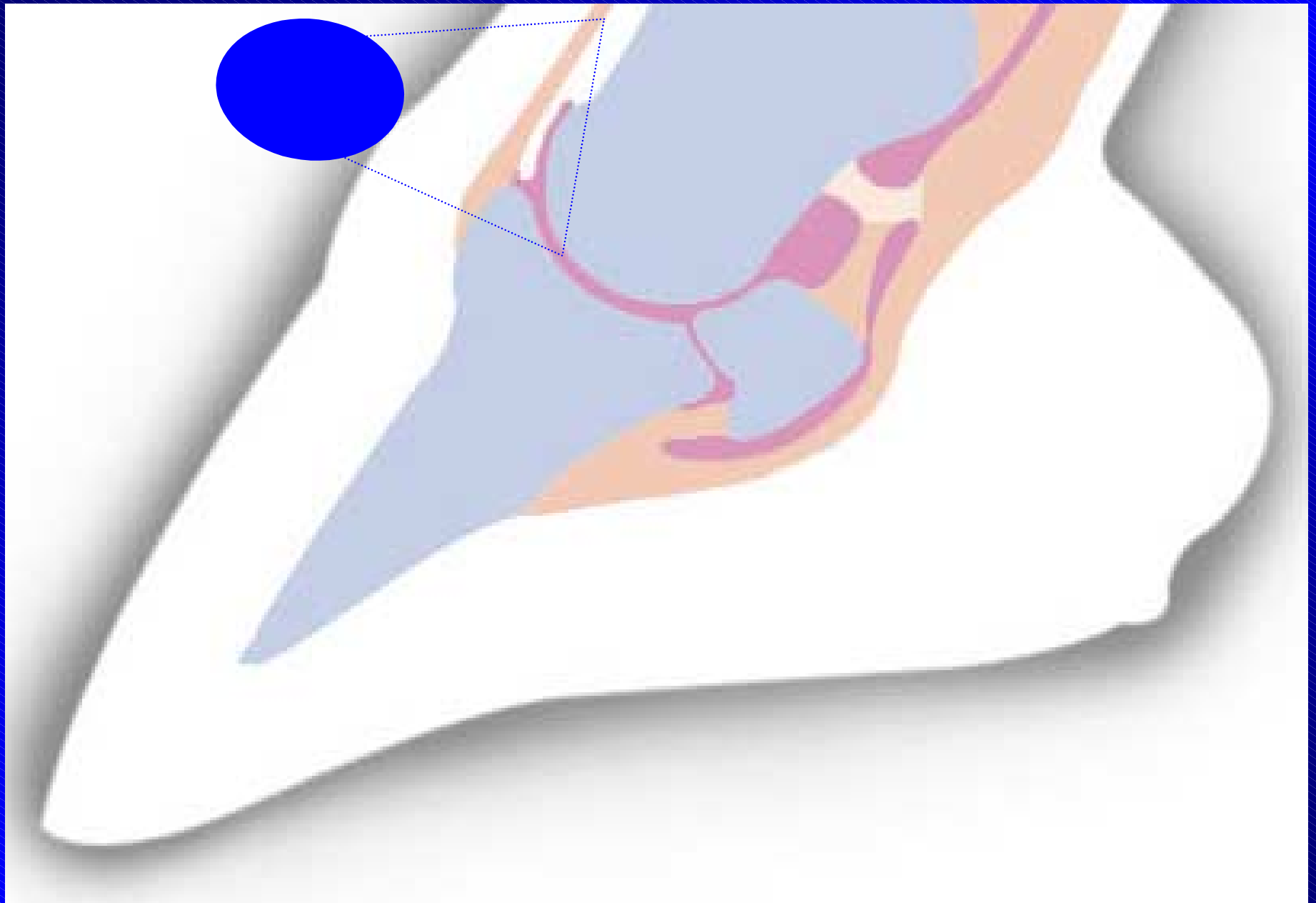
- 10 MHz microconvex linear array transducer
- Ventral frog
- Transverse and longitudinal plane



PODOTROCHLEAR REGION

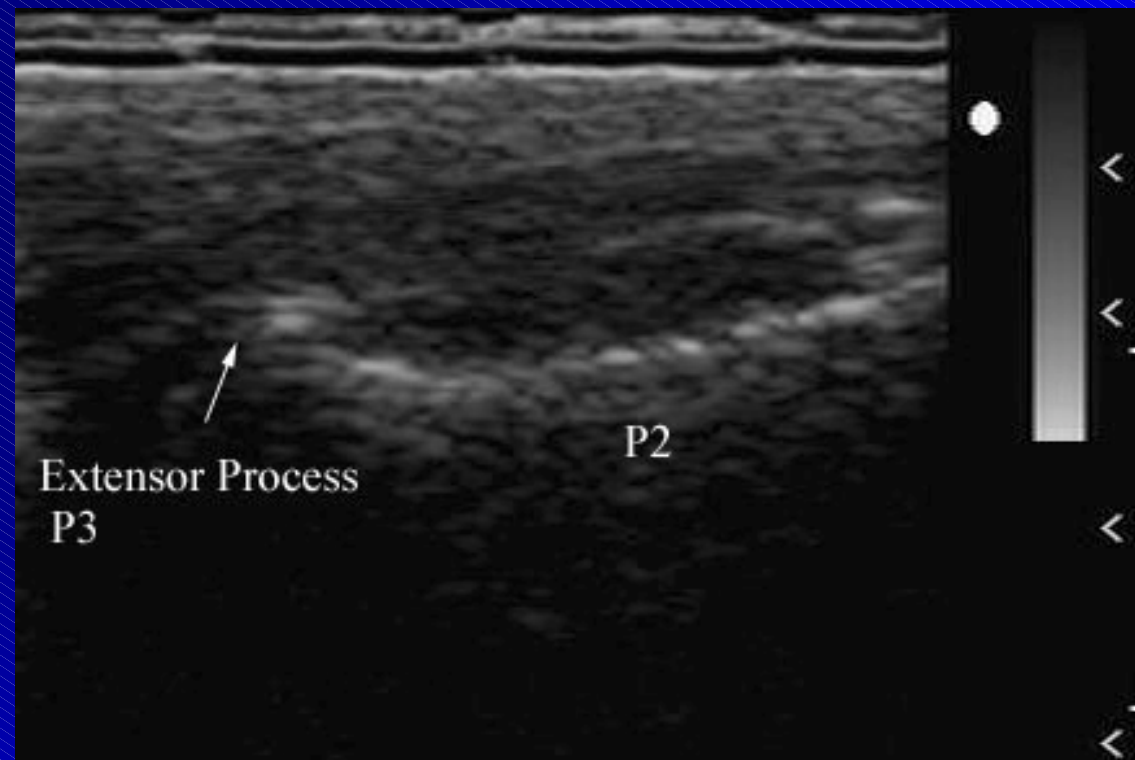
- **Digital cushion**
 - width
- **Navicular bursa**
 - width
- **Impar ligament**
 - width
 - cross sectional area
- **Deep digital flexor tendon**
 - width
 - cross sectional area

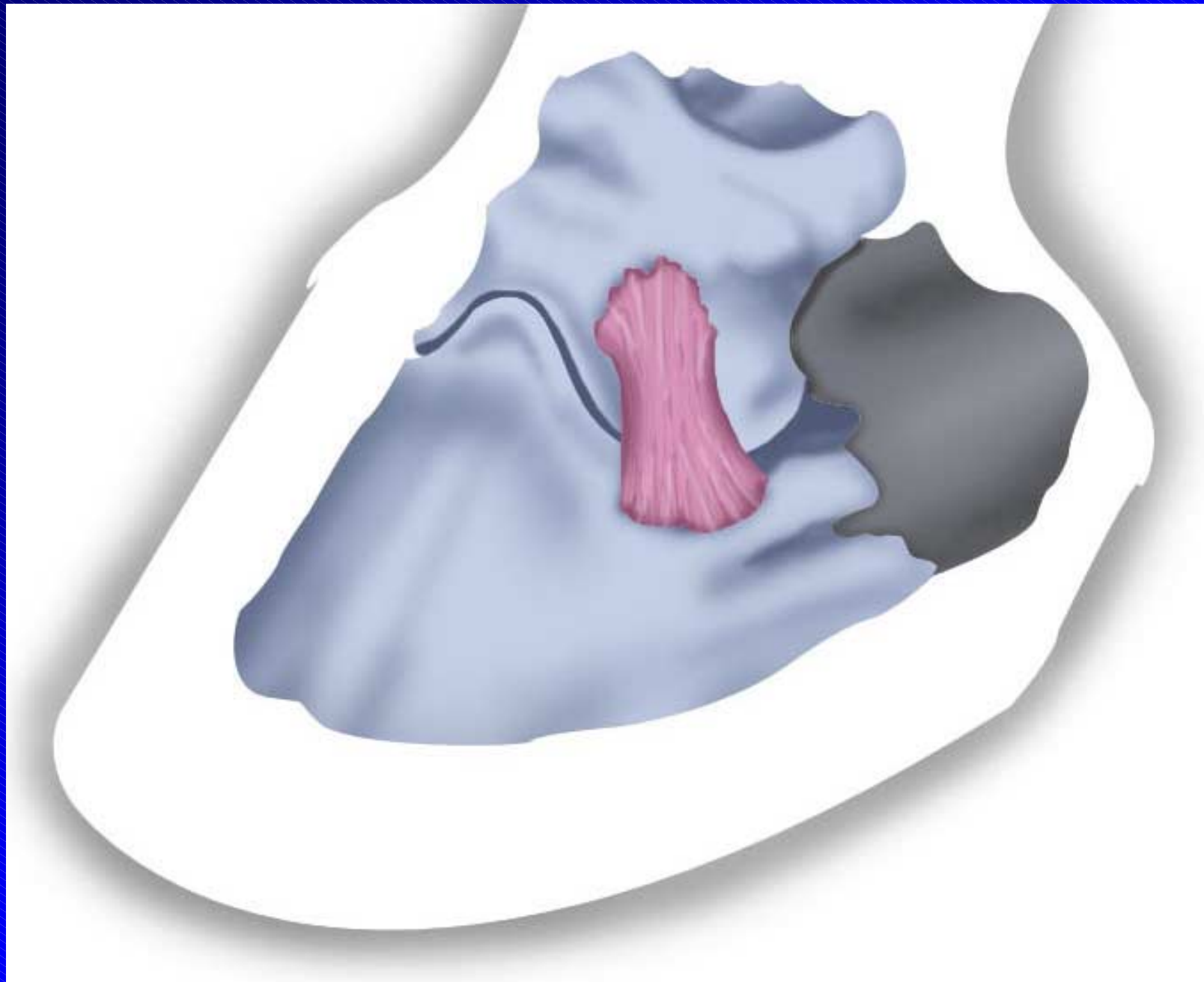




DISTAL INTERPHALANGEAL JOINT

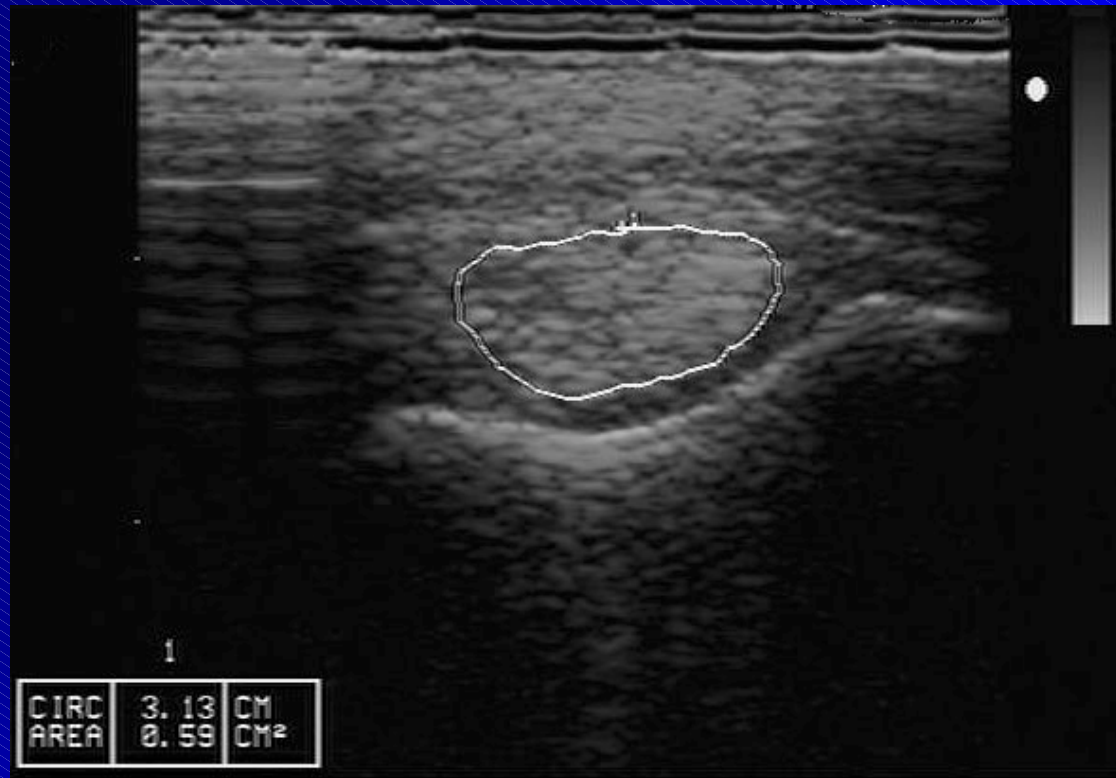
- Thickness
 - 0.213 ± 0.357 cm
- Length
 - 1.203 ± 0.442 cm

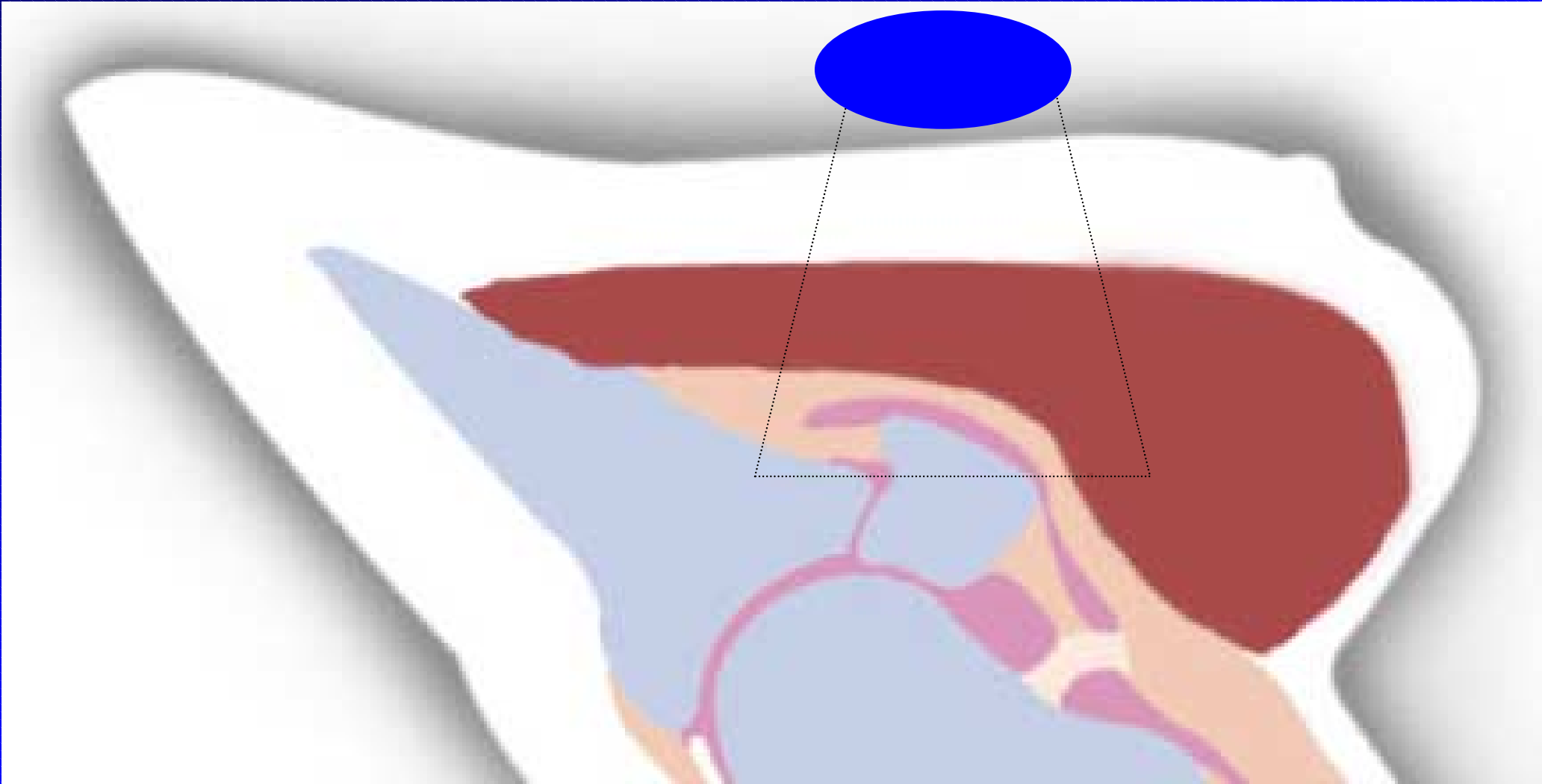




DISTAL INTERPHALANGEAL JOINT: collateral ligaments

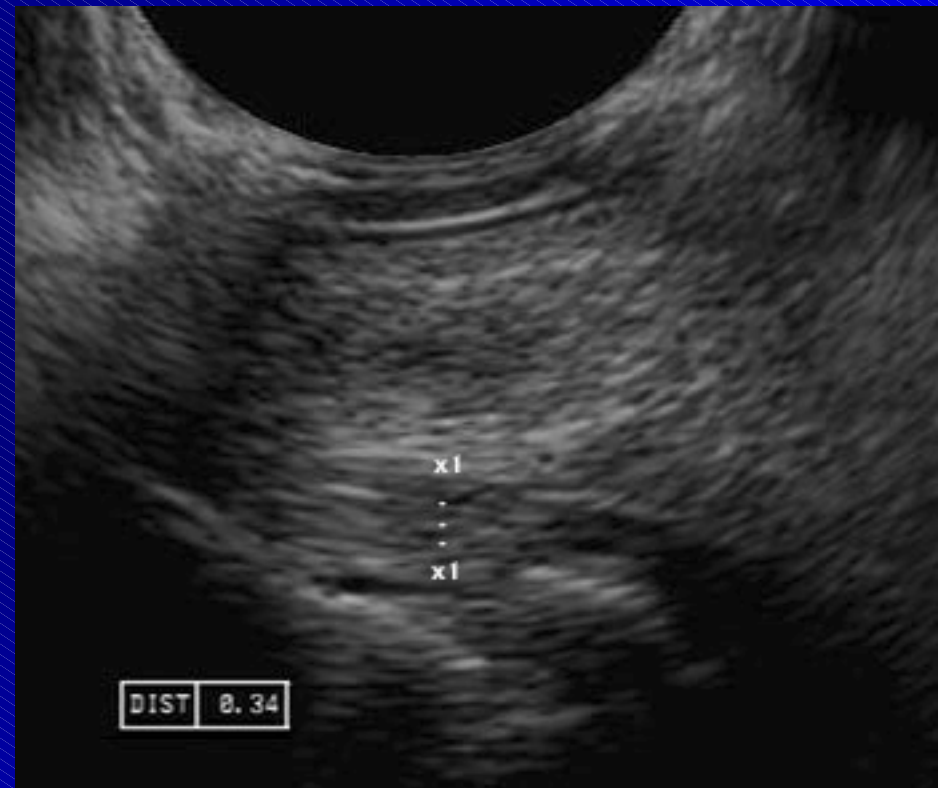
- Medial
 - cross sectional area
 - $0.630 \pm 0.046 \text{ cm}^2$
- Lateral
 - cross sectional area
 - $0.621 \pm 0.043 \text{ cm}^2$





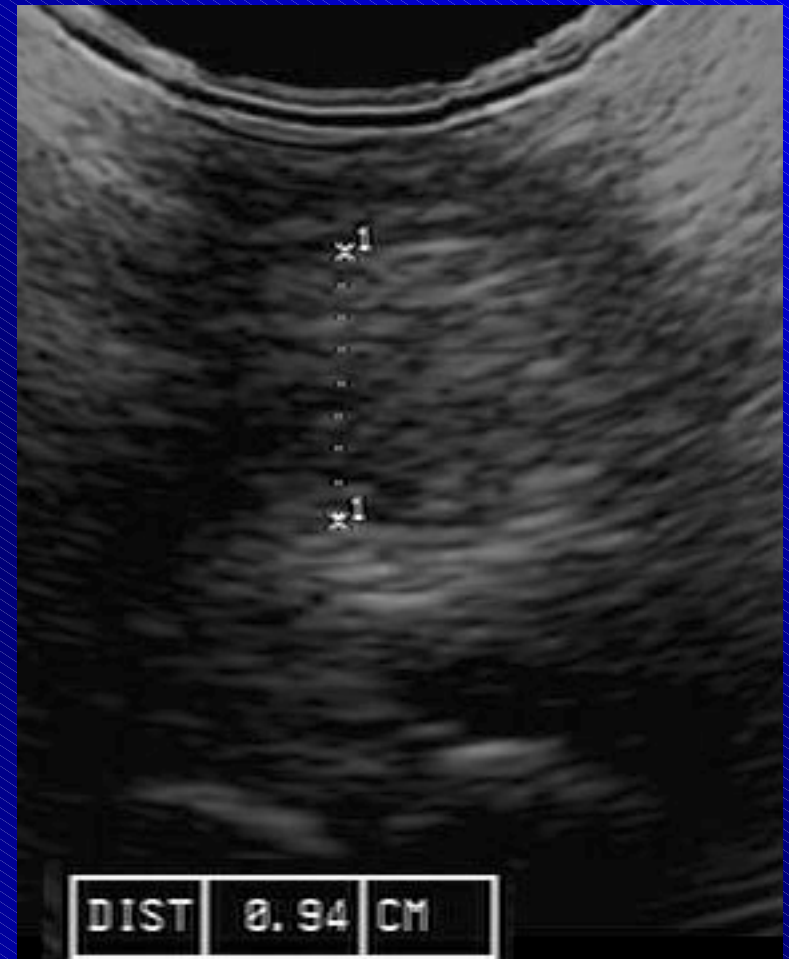
PODOTROCHLEA

- Length of impar ligament
 - 0.345 ± 0.079 cm
- Width of DDF proximal to insertion
 - 0.360 ± 0.050 cm



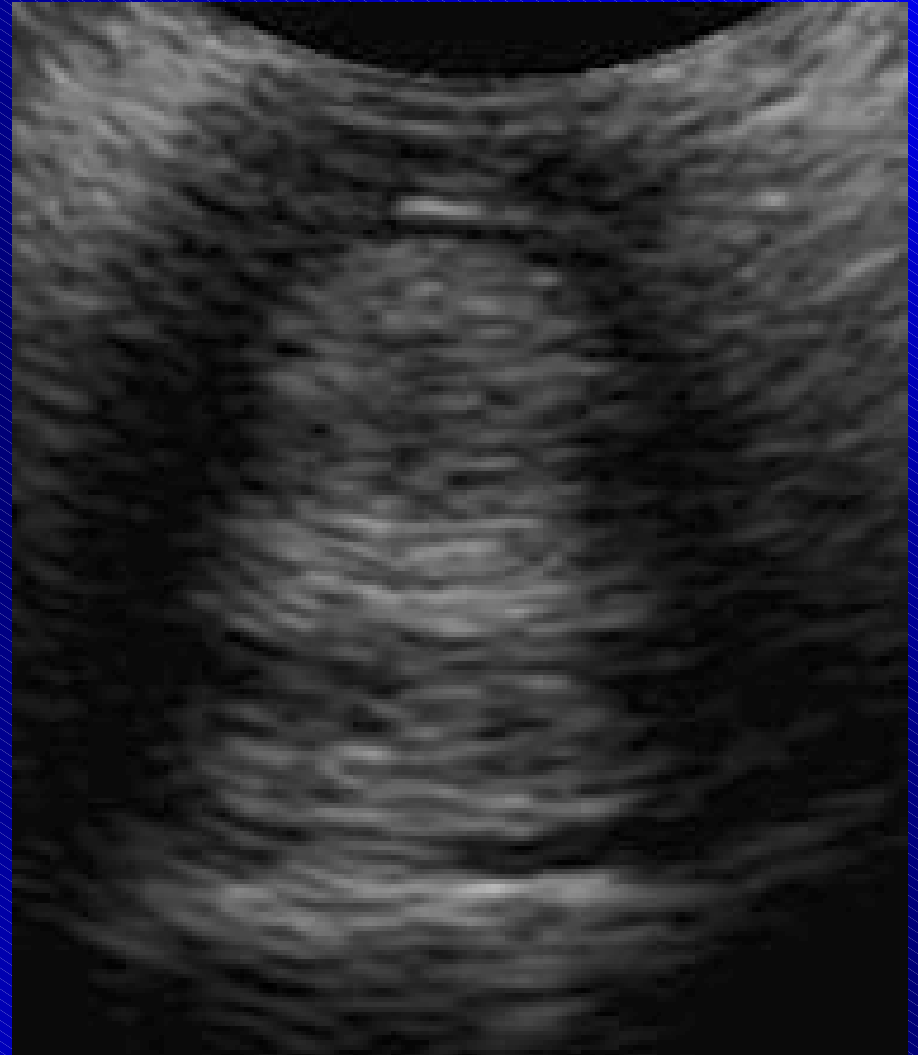
PODOTROCHLEA

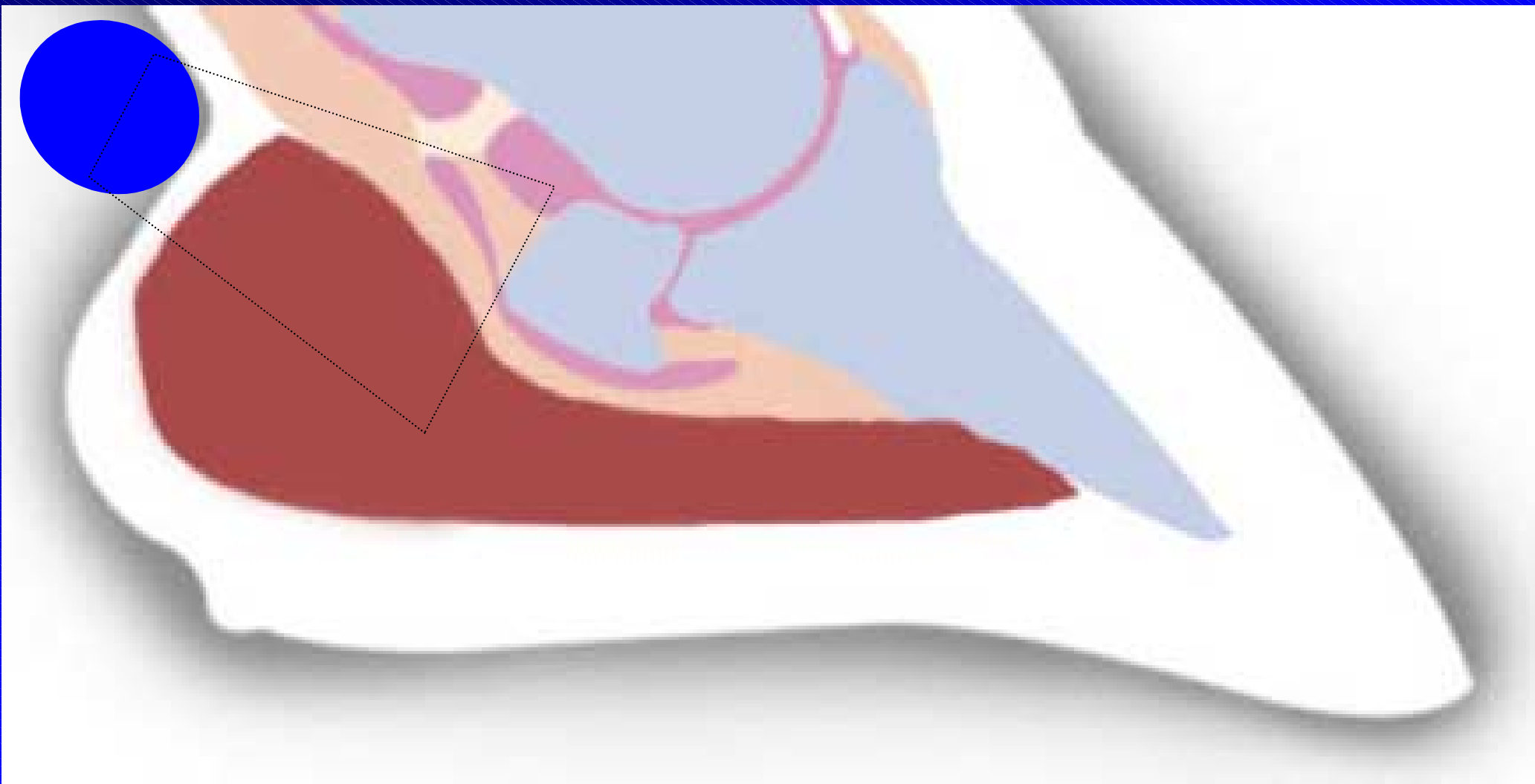
- Digital cushion
 - Width
 - 1.077 ± 0.145 cm
- Navicular bursa
 - Width
 - 0.269 ± 0.070 cm



PODOTROCHLEA

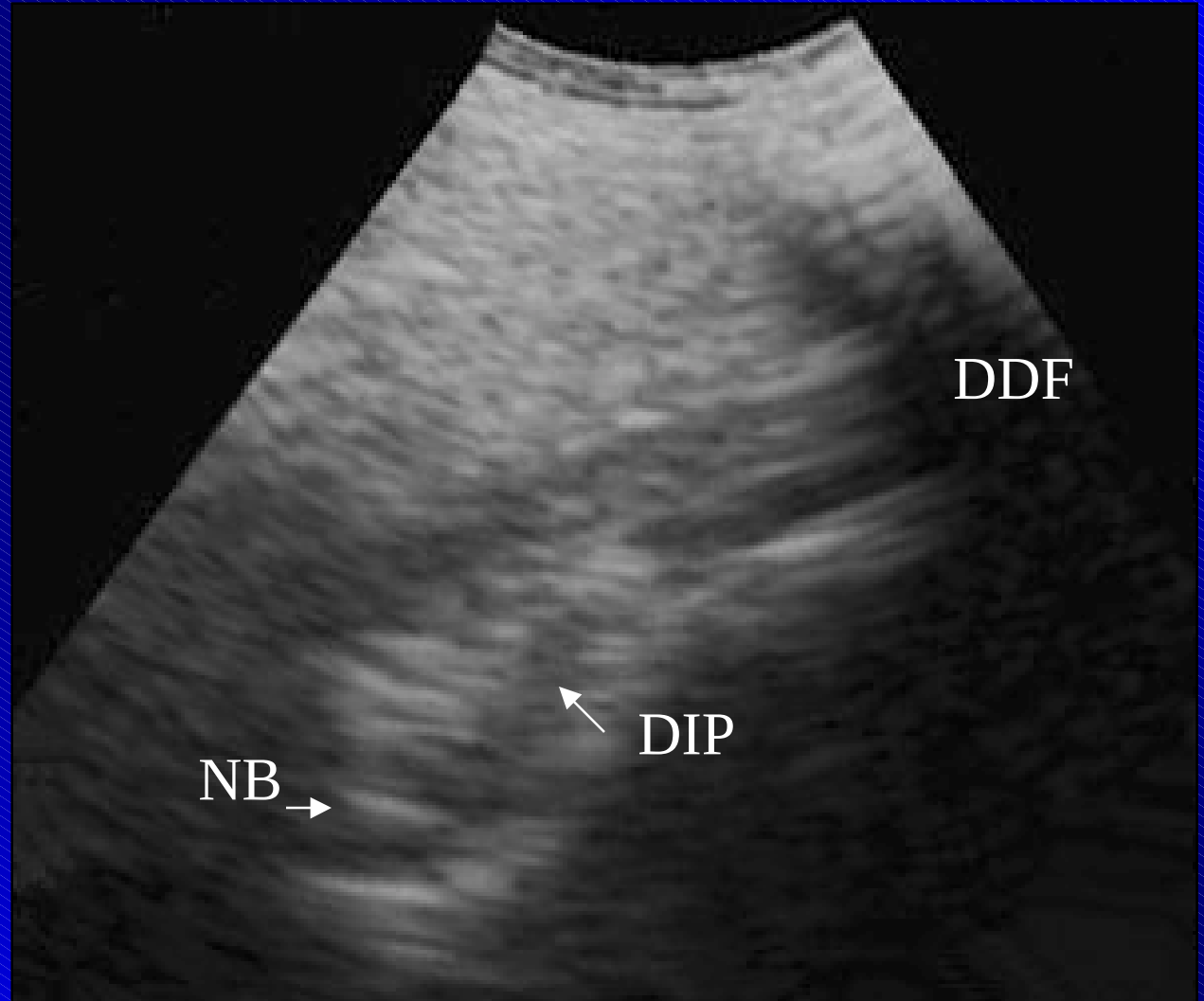
- Cross sectional area of impar ligament
 - $0.223 \pm 0.057 \text{ cm}^2$
- Cross sectional area of deep digital flexor tendon
 - $0.473 \pm 0.140 \text{ cm}^2$





DEEP FLEXOR TENDON HEEL BULBS

- Width
 - 0.844 ± 0.099 cm



ASSESSMENT of the HOOF



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